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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

The Severn Bridge

IT appears that the rejection by the Parliamentary Committee of the Bill promoted jointly by the Monmouthshire and Gloucestershire County Councils has not been accepted in all quarters in its true light as a legitimate exercise of the Parliamentary duty to reject schemes involving the unwise use of public and local authorities' funds. As we record in our news columns (page 1056) Alderman Panes is reported to have interpreted the rejection of the Bill as a heavy blow to the possibilities of opening out South Wales, and to have added that "the decision of the committee had proved the powerful influence of the railways." It is therefore timely that Sir James Milne, General Manager of the G.W.R., should have explained the position clearly in an article we reproduce on page 1046, especially as the Bill was rejected on the promoters' own case, and the opponents thus had no opportunity (excepting in cross-examination) of setting out the strength of their objections. As Sir James shows, the favourable effect of such a bridge on South Wales industrial and tourist traffic would be very small; the effect of its construction in reducing South Wales unemployment would be unimportant; and the permanent adverse effect on the existing rail traffic (intimately bound up with the industrial prosperity of the district) would far outweigh such advantages as might accrue.

* * * *

Rail and Air Co-ordination

On Monday of this week the new summer services of Railway Air Services Limited and associated companies were introduced over the 1,400 route miles to be covered daily throughout the present season. It is notable that these services, alone of all those operated within the British Isles, are co-ordinated to any great extent with any other form of transport. The whole organisation of the four group railways is at the disposal of the prospective air traveller, who may book his or her passage at any railway station or town office. The passenger may enjoy all the facilities afforded the surface traveller, including such concessions as the conveyance of luggage in advance by rail. Should it be inconvenient to return by air, the passenger's ticket is available for first class rail or steamer travel, while the tourist in a hurry may, on paying a supplement, make his or her return rail ticket or bulk travel voucher available for any suitable R.A.S. service. A special concession is also made to the railway season-ticket holder, who is allowed a discount off the fare for journeys by air between points within the area of availability of their season tickets.

* * * *

The Week's Traffics

Both passenger train and general merchandise receipts of the four group companies for the past week show improvements of substance over those for the corresponding week of 1935, but coal traffics are mostly down, probably because of seasonal influences. For the year to date the total traffics of the four companies together amount to £58,475,000, an increase of £1,551,000, or 2·72 per cent. In the aggregate, passenger train takings are down £9,000, mainly attributable to the heavy Jubilee traffics of last year. Merchandise receipts for the year show an advance of £973,500, to which all companies contribute, the L.M.S. increase being £534,000. In coal the increase is £586,500.

	21st Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R.	+ 11,000	+ 30,000	− 16,000	+ 25,000	+ 776,000	+ 3·36
L.N.E.R.	+ 13,000	+ 1,000	+ 1,000	+ 15,000	+ 596,000	+ 2·98
G.W.R.	+ 6,000	+ 5,000	− 5,000	+ 6,000	+ 215,000	+ 2·26
S.R.	+ 12,000	+ 3,500	− 1,500	+ 14,000	+ 54,000	+ 0·74

London Transport receipts for the past week were £570,300, an increase of £26,900, and for the 47 weeks of the financial year the advance is £324,200. On the Great Northern Railway (Ireland) the increase to date is £14,900, and on the Great Southern it is £52,104.

* * * *

The Whitby & Pickering Railway

With the coming of the industrial revolution, the ancient port of Whitby found it necessary to consider suitable ways of improving the very poor means of communication between it and inland places, and as early as 1793 a canal between Whitby and Pickering was mooted, but the scheme was found to be impracticable. The inhabitants of Whitby seem to have been early converts to railway transport, for the original 1818 list of subscribers to the Stockton & Darlington Railway contained the names of no fewer than 19 Whitby persons, and it is therefore not surprising that the idea of a railway between Whitby and Pickering was broached as early as 1826. In the face of an alternative scheme, George Stephenson supported the Pickering line, which was sanctioned by Parliament in

1833, opened in part in 1835, and, on its completion throughout, formally opened with horse transport on May 26, 1836. In view of the centenary falling this week, the British Broadcasting Corporation included a talk in the North Regional programme on Monday night, May 25, when Mr. R. Underwood, son of one of the founders of the railway, spoke about the line and its history. The total cost of the line—24 miles long—was £105,000 and this was subscribed almost exclusively by Whitby and Pickering people. In early years the regular coach traversed the distance in rather less than 2½ hours, making the average speed nearly 10 m.p.h. During the whole of its independent career, the Whitby & Pickering Railway used only horse traction and remained an isolated line. It was sold to the York & North Midland Railway in 1845 and reconstructed for locomotive traction. A sketch map and brief details of the railway appear on page 1053.

* * * *

The Northern Belle Cruising Train

For the fourth successive year the L.N.E.R. has arranged a series of land cruises by the cruising train Northern Belle. This season three trips have been scheduled, the first of which leaves King's Cross this evening (Friday) at 9.0 p.m. Although the broad outlines of the tour, as originally evolved in 1933, have proved so popular as to justify their retention, various detail changes have been made from year to year as the outcome of experience. A notable feature this year is that the whole cruise is north of the Border (excepting, of course, the night journey each way to and from London) and so the Baroness Clifton, who has written the attractive tour booklet presented to each passenger, has justly taken as her title "A Scottish Voyage of Discovery." She points out that much has been said, written, and even broadcast of the profound attractions of sea-cruises; less time, on the other hand, has been devoted to discovering, and pointing out, the delights of land-cruising. She adds that the land-cruise, however, should be quite magnetic, in its power of appealing to those sections of the public which may, with accuracy, be described as "discerning." The truth of this can already be vouched for by those who have enjoyed the attractions of the tour in past years, and we have little doubt that the next few weeks will see three more train loads of satisfied passengers arrive at King's Cross convinced that, however well they may think they know their Scotland, the land-cruise of the Northern Belle is capable of unfolding new vistas.

* * * *

New York - Chicago Again

For a year to pass without any acceleration of the New York-Chicago service would be a novelty in present-day American railway operating. This summer some further slashing cuts of the times of several of the most noted trains became effective on April 26. Both the westbound Commodore Vanderbilt of the New York Central and the Golden Arrow of the Pennsylvania were speeded up by no less than 80 min., bringing their overall times down to 17 hr. 35 min. in each case; the westbound Iroquois of the New York Central cut over 2 hr., and now takes 18½ hr. The westbound Rainbow of the Pennsylvania was accelerated by 85 min., but previously took over 20 hr. on the journey, and now comes down to 18 hr. 55 min. In the reverse direction the Golden Arrow has been expedited by 55 min. to make the run in 17 hr. 25 min., while the eastbound Commodore Vanderbilt is even 5 min. quicker than this. Another event is the introduction of a brand new express in the eastbound direction by the New York Central, called the Water Level Limited, after the well-known New York Central slogan—"Water Level Route—You Can Sleep"—leaving Chicago at 2.45 p.m., and taking 17 hr. 25 min. on the run to New York. For the present the Twentieth Century and Broadway Limited expresses stick to their 16½-hr. bookings, but although these are 3½ hr. less than the exclusive 20-hr. schedule which operated for so many years with these famous trains, the fact that other services are now run in as little as 17 hr. 20 min. will doubtless bring the two best-known flyers down to a 16-hr. flight or less before very long.

* * * *

Making the Maximum Use of Electricity

The fact that 135 daily runs, with an aggregate mileage of all but 5,800, were already being run at start-to-stop speeds of 60 m.p.h. and over by the Pennsylvania on its newly-electrified lines between New York, Philadelphia, Baltimore and Washington, might well have been regarded by that company as sufficient justification for the maintenance of the timetable *status quo* for some time to come. But, as emphasised in the previous note, a standstill in train times today is a thing unknown in America. From April 26 the whole of the electric service was quickened once again. Between Wilmington and Baltimore 26 trains are booked every day to cover the 68·5 miles in from 61 to 67 min., a general overall average of 64·7 m.p.h., and a world's record for inter-city railway transport. Over the 224·8 miles between New York and Washington thirty trains daily run in an average time of 4 hr. 8 min., the best time—that of the Congressional—having come down to 3 hr. 40 min., all stops included. Between the Pennsylvania station at New York and Broad Street station, in the heart of Philadelphia, many of the hourly trains will run in 1 hr. 40 min., notwithstanding the fact that all of them make at least five intermediate stops in this journey of 91·3 miles. Such a splendid example of mass acceleration and systematic service between great cities is worthy of wide imitation, in Great Britain in particular.

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Outside Power for Air-Conditioned Cars

Air-conditioning makes large demands upon storage batteries whenever the compressors and fans are running. Normally, there will be current from the dynamos to make good the energy drawn from the batteries, but in some services the batteries may gradually lose their charge. The largest batteries would quickly become exhausted during a stand at an intermediate station, or even before the commencement of the journey, due to energy taken for the purpose of pre-cooling the train, were they the sole source of power. Realising that the air-conditioned train is not self contained, the Americans have now made extensive provisions for receiving them and supplying them with outside power wherever this becomes necessary. In the May issue of our American contemporary, the *Railway Electrical Engineer*, the arrangements made at the Washington passenger terminal are described. At this terminal, steam ejector and ice-activated cars must be accommodated, besides several types of compressor car. The last mentioned are equipped with a.c. stand-by motors in some instances, and these can draw upon an a.c. supply for outside power at most stations. Others demand d.c. power and all may require it for battery replenishment. Points for plugging in on an a.c. supply are available almost everywhere at the Washington terminal, while d.c. points are available over restricted zones. To render d.c. power available wherever there is an a.c. point, portable motor generator sets, mounted on four wheels, have been acquired. Each of these can service two cars simultaneously even though

the batteries in them be of different capacities and run down to different degrees.

* * * *

Riding Qualities of Passenger Coaches

Our American contemporary, the *Railway Mechanical Engineer*, discussing the riding qualities of modern passenger vehicles, suggests that it might be a good idea for the railways to make an intensive effort to discover by direct contact what are the views of passengers, on this subject. The travelling public is not, remarks our contemporary, universally enthusiastic about all the new types of cars. When a traveller selects the railway for a journey in preference to a highway vehicle or his own motorcar, he does so in many cases because he believes that he can enjoy greater comfort and safety, apart from the question of speed. Judging from casual remarks that have been heard from time to time, passengers have a real cause for complaint in the poor riding qualities of some of the new trains. It is difficult to read a book or paper in a car that vibrates or has a tendency to side-sway, whilst at high speed violent action of the car body gives the nervous passenger a feeling that something might happen. The fact that anything rarely *does* happen is of small comfort to that type of passenger. The article concludes with the statement that although some of the passenger coaches placed in service in the past four years are winning new friends for the railway on every trip, there are unfortunately, other instances where there is still much to be done in order to provide the traveller with the comforts he has the right to expect.

* * * *

Metallurgical Developments in Engineering

One of many striking facts mentioned by M. Charles-Eugène Schneider in his address last Tuesday to the Institution of Civil Engineers on recent developments in metallurgy and their influence on engineering was that, thanks to the improvements made in structural metals, 1,000-ton trains could now travel at a speed of over 80 m.p.h. more safely than 100-ton trains in 1840 ran at 25 m.p.h. M. Schneider pointed out that the present year was the 100th anniversary of the taking over of Creusot works by his grandfather. In 1836 France was the second metallurgical country in Europe, the first place being occupied by England, whose output of pig iron and wrought iron was equal to that of the rest of the world. At that time most of the 543 blast furnaces in France were fired with charcoal. The old forges had to be located near forests and on the banks of rapid flowing streams, suitable for working the hearth bellows and small mechanical hammers by water wheels. The introduction of coal led to a complete change, both in working and location of plants. In 1836 Messrs. Schneider produced 7,000 tons of iron; in 1865 the Creusot works needed 26 rolling mill sets to roll 100,000 tons per annum; whilst today in a modern steelworks of a million tons capacity, five graded sets would suffice for producing all the usual bar sections.

* * * *

Permissive Block Working

In his report on the collision at Barrow-on-Soar, L.M.S.R., on January 21, summarised on page 1052, Colonel Trench expresses the view that permissive block instruments are to be preferred to simple telegraph bell signalling, although the latter has given good results for many years and is still in force on a considerable mileage of the company's goods lines. A mistake in bell signalling occurred, but the contradictory evidence of the men concerned made it difficult to decide precisely what happened. All permissive working must necessarily involve some risk, because trains are allowed to enter occupied sections, and reliance must be placed on careful driving. The essential thing is to inform drivers of the state of the line ahead, which was not done at Barrow. As Colonel Trench observes, the risk of accidents obstructing adjacent passenger lines alone makes it desirable that permissive working should be carried on, as nearly as possible, as efficiently as absolute working. Local conditions must govern what methods are adopted, but we agree with Colonel Trench in thinking that bell signalling alone is hardly sufficient now, at least on lines where an accident may foul a passenger line. Permissive working should not mean that less care is necessary; if anything the contrary is the case.

* * * *

The Rail Corrugation Problem

Although rail corrugation has been investigated all over the world for many years, there is still no sign of a satisfactory explanation of the phenomenon. In its recently published report, the Committee on Rail of the American Railway Engineering Association states its opinion that the many variables preclude the determination of a general cause, but recommends as a preventive the reduction in wheel loads, increasing the wheel contact area, and improving the quality of the rail steel. After quoting the conclusion drawn from a series of theory tests completed in 1929, " that rail corrugation is simply the result of overloading the running surfaces of rails with loads that vary more or less periodically in intensity," it reports that corrugation on steam railways is quite prevalent, and occurs on straight and curved track with various conditions of ballast and roadbed, and under high and low speed traffic. On the Lehigh Valley Railroad, the committee found that rail laid in 1928 that had become badly corrugated is now apparently being levelled off by traffic. It is held that corrugations are not a serious problem on steam railways, especially as where they become very marked they can be removed at moderate expense by grinding. The committee reports that the Lehigh Valley rail grinding car, described in our issue of May 8, removes corrugations at a cost of about $22 a mile.

* * * *

Low Water in Locomotive Boilers

The Superintendent of Motive Power of an American railway recently contributed to the correspondence columns of our contemporary, the *Railway Age*, some useful observations on the prevention of boiler explosions due to low water. Remarking that the crown plate was the most sensitive part of the locomotive boiler, he suggested that it should be protected by something more than a warning in the event of low water. Although the fact that no water is showing in the gauge glass should be sufficient, the human element makes an additional protection necessary. Of all the devices so far employed, such as low water alarms, and fusible plugs, the most positive precaution, according to this correspondent, is afforded by the Thermic syphon, experience having proved that by discharging water over the roof of the firebox and the girder support, it will actually prevent explosion during periods of low water. As long as there is any water in the boiler, even if its level falls below the crown plate, there will be water surging over the top of the firebox in sufficient volume to avoid danger. In addition to warning or protective devices, careful inspection and maintenance is of the utmost importance, as many a crown plate has been ruined in the running shed because of failure to demand that those in charge shall jointly certify that the boiler is actually full of water before it is lighted up.

A Successful Transport Congress

THE selection of Birmingham as the venue for the Institute of Transport Congress this year was appropriate, as that city has been closely identified with progressive transport since the very early days of railways. It is now served by a close network of railways, tramways, and buses, and there can be few cities whose transport undertakings are more efficient and up to date than Birmingham. It was also peculiarly appropriate, in view of the subjects discussed, that the President of the institute, who presided over the congress, should be the Permanent Secretary of the Ministry of Transport. His exceptional knowledge of the problems dealt with enabled him to sum up the debates with consummate skill, while it cannot have been without advantage that so prominent a representative of the Ministry should hear, however unofficially, the views and difficulties of transport operators. The annual congresses of the institute, which draws its members from all branches of transport, serve a useful purpose in providing opportunities for the discussion of transport problems of all kinds and enabling members of the various sections of the industry to get to know each other's points of view. Indeed, it is the catholicity of the institute which is its chief claim to support by the industry. It provides a platform for all transport men, whatever their particular branch, and its graduates and students are taught to regard transport as a whole, and not simply as railways, or road, water, or air transport. There is thus growing up a generation which regards transport in its widest sense.

It was noticeable during the discussions that many apparently took it for granted that at some time in the future transport of all kinds would be nationalised or brought under some form of public control, and regrets were expressed that co-ordination of services had progressed so slowly. In this connection the suggestion was advanced that trolleybus services, equally with those of the motor bus, should be brought under the jurisdiction of the Traffic Commissioners, and that the latter should also have some control over rail services and facilities. The need for a co-ordinated, cheap, and efficient transport service was stressed, and a clear division of function between the various forms of transport was shown to be an urgent necessity under existing conditions. We dealt with two of the three papers read at the congress last week. Mr. Payne's attempt to tell the trader in what degree he had failed to carry out his function so far as transport is concerned was by no means relished by traders' representatives, who however admitted their need of some guidance on the matter. The inter-dependence of trader and transport is an axiom of commerce to be borne in mind. Regulating the relationship of private cars and buses was a problem the discussion of which arose from the paper on the Road Traffic Acts on the third day of the congress.

The private car was rightly described as the most serious competitor of the railway and the public service road vehicle. No form of co-ordination is possible between competitors such as these, and the congestion in towns is undoubtedly due largely to the preponderance of the private car. The seriousness of this congestion was emphasised, but little hope was expressed that any effective restriction would be placed on the private car, although blowing up the centre of the city for the purpose of constructing a car park was one of the most revolutionary suggestions. There seemed to be general satisfaction with the operation of the Road Traffic Acts which, it was stated, had brought order out of chaos and given the road transport industry protection and some security of tenure. An appropriate warning was given, however, of the danger of cutting down the supply of transport to existing demand, when the prospect of international strife might at any moment call for such an expansion of the service as would render unnecessary any form of restriction.

* * * *

The German State Railway in 1935

THE annual report of the German State Railway for the year 1935 opens with extensive reference to "two specially important events," the celebration of the centenary of the first railway in Germany and the reunion of the Saar railways with the rest of the German system. The policy and action of the German State Railway Company have not been the least of the factors contributing to the smooth reorientation of the Saar industry and commerce. The continued revival of business in Germany resulted in a further substantial increase in almost every class of traffic, and the confidence expressed in the report for 1934 has been amply justified, the balance on operating account rising to 152·2 million marks (nearly 6½ times the figure for 1934), and the operating ratio falling to 95·75, compared with 99·28 in 1934 and 104·66 in 1933. The goods tonnage increased by 14·2 per cent. compared with 1934 and by 37·6 per cent. compared with 1933, the corresponding increases in passenger traffic being 9·5 per cent. and 20 per cent. respectively. In general, the traffic level of 1913 has been regained and in some respects it has been surpassed. As in previous years, however, receipts have not kept pace with the growth of traffic, owing partly to the many reduced fares and rates provided in the national interests and partly to the continued transference of more profitable traffic to other means of transport, particularly road vehicles. The increase in goods receipts for 1935 was only 8·6 per cent. compared with 1934 and 28·1 per cent. compared with 1933, and the corresponding figures for passenger receipts were 7·8 per cent. and 16·9 per cent. respectively. The gross receipts at 3,586·1 million marks are 7·8 per cent. higher than in 1934 and 22·8 per cent. higher than in 1933, but still 33 per cent. below the peak figure of 1929. Expenses of operation, maintenance and renewals are about 4 per cent. higher than in 1934 and 12·3 per cent. higher than in 1933. Passenger tax amounting to 216·97 (compared with 204·62) million marks is, of course, excluded from the operating account. The figures for the last three years are:—

	1935	1934	1933
Passengers carried, millions ..	1,488·7	1,359·6	1,240·5
Goods tonnage, million tonnes*	361·3	316·4	262·7
Passenger and luggage receipts, millions RM.	988·7	917·0	845·9
Goods receipts, millions RM. ..	2,324·4	2,140·0	1,815·2
Gross receipts, millions RM. ..	3,586·1	3,326·3	2,920·6
Expenses (operation, maintenance and renewals), millions RM.	3,433·9	3,302·3	3,056·6
Balance on operating account, millions RM.	+152·2	+24·0	—136·0
Operating ratio, per cent. ..	95·75	99·28	104·66

* Excluding service material

A satisfactory feature was the uniform improvement in monthly receipts throughout 1935 compared with 1934. This is indicative of the steady improvement in conditions but is not fully representative of the extent of the latter, because the company has contributed even more heavily than before in the shape of reduced rates, to say nothing of free "winter help" transport to the value of about 16-million marks. In 1935, 68 per cent. of the total goods tonnage was carried at reduced rates compared with 65·8 per cent. in 1934, and 66·35 per cent. of the passenger traffic was at reduced fares, compared with 64 per cent. in 1934. The number of employees increased by

about 25,000, namely, about 12,000 on the Saar railways, and the remainder necessitated by the increased volume of traffic and the preparations for the State Motor Roads Company. The profit and loss account shows besides the operating surplus of 152,217,910 marks and the sum of 181,390 marks brought forward, special receipts amounting to 48,969,536 marks, made up of 6,627,561 marks from tax vouchers, 11,497,526 marks mainly from profit on the sale of securities, 4,315,550 marks from the return of the Saar railways, and 26,528,900 renunciation of the State loan made under the law of March 31, 1931, for railway work in the distressed areas of the east. Even so, a withdrawal of 26,519,073 marks from special reserve is required to balance the profit and loss account at 227,887,910 marks, because the credit side includes 70,000,000 marks paid to the Reich, 37,976,698 marks for debt and loan charges, 16,680,000 marks for depreciation of additions and betterments, 27,561,212 marks for statutory equalisation reserve, and 75,670,000 marks for preference dividend. Moreover, it is pointed out that the allocation to the statutory equalisation reserve ought to be higher by 44·2 million marks, 36 million marks ought to have been set aside for preference share redemption, and the payment of 75·7 million marks preference dividend was made possible only by extraordinary receipts and withdrawal from reserve, so that the operating surplus was actually about 156 million marks less than required for full and normal balancing of the profit and loss account.

It is hoped that in 1936 an additional 165 million marks may be made available by the combined effect of increased traffic, economies in administration and the 2 per cent. increase in goods and live stock rates. The Saar railways have added 390 million marks to the balance sheet valuation and this, with 163,335,397 marks for additions and improvements, brings the asset value of the fixed undertaking up to 27,225,701,805 marks. Stores have risen to nearly 159 million marks; cash, bank and short-term assets exceed 779 million marks; and long-term claims (mainly loans in connection with electricity supply) come to nearly 122 million marks. The ordinary share capital still stands at 13,000 million marks and issued preference shares at 1,081 million marks; reserves total about 12,420 million marks, loans about 876 million marks, and miscellaneous liabilities over 934 million marks. The national importance of the undertaking is indicated by the expenditure of 2,335 million marks on salaries and wages (68·13 per cent. of total operating expense), and it is estimated that about 1,200 million marks was paid for supplies, deliveries, and special work. During the current year renewals of rolling stock are to be on an increased scale. Political charges, taxation and preference dividend payments amounted to 639 million marks in 1935, or one-fifth of the operating receipts, and showed 29 million marks increase on the preceding year. Further simplification and unification of administration were effected during 1935, and services were improved and schedules accelerated on secondary as well as main lines. The policy of reduced fares has been continued and extended. Goods services have been accelerated by increased use of light locomotives at intermediate stations, developments in light trains, container traffic and other means. The arrangements for training personnel have been further improved and the major problems of road and rail competition may be regarded as settled by the new organisation. Constructional work of all kinds has been carried on very actively within the limits of the means available, and it is felt that the burden imposed on the public by the increased good tariffs will be fully compensated by the greater services which the company can now render to the economic and industrial life of the country.

Rating of Railways

ON May 20, as briefly recorded last week, the House of Lords gave judgment in the appeal of the Assessment Authorities against the judgment of the Railway and Canal Commission on the question whether certain parts of railway stations, which are "let out" by the companies, form part of the railway hereditaments, the valuation of which is made by the Railway Assessment Authority, or whether they are capable of separate assessment and, in consequence, dealt with by the local assessment committees. As test cases Victoria station was taken as an example of a passenger station and Beckenham Junction as a goods station. At the passenger station the premises in question consisted of Smith & Son's bookstalls, a bank, various shops and show cases. In the goods yard land occupied by traders sometimes as sites for buildings belonging to them, were the subject of dispute. In regard to passenger stations, the practice hitherto has been to treat bookstalls, &c., as forming part of the railway hereditament, the rates being in consequence payable by the railway company. This practice was based on a decision of the Court of Appeal in 1882. (Smith *v.* Lambeth Assessment Committee.) As to the premises in the goods yards, the practice has varied in different localities and with different companies. In some areas traders' buildings have been included in the station assessment, whilst in others the traders have been separately rated and have paid their rates direct to the local authorities. The decision of the House of Lords is that all such premises are capable of separate assessment and in future, therefore, the local authorities will in all cases collect the rates direct from the tenants. The practical effect from the companies' point of view is that the rents which are derived from the separately rateable tenants will be excluded from the net receipts which form the basis of the valuation of the undertaking, and the net annual value of such undertaking will accordingly be diminished. The amount to be paid by the companies into the Railway Freights Rebates Fund will also be reduced and this will be a gain to the rating authorities unless the subject of the separate assessment is an industrial hereditament when the tenant will be entitled to the three-fourths exemption.

This decision of the House of Lords should enable the valuation of the Southern Railway to be completed and, if reasonableness prevails, it should also enable agreements to be reached in regard to the net annual values of the other companies, not only for the first valuation *in cumulo*, which covers the period April 1, 1931 to March 31, 1936, but also for the second valuation which has effect from April 1, 1936 to March 31, 1941. It is reported that the County Councils Association has advised the county valuation committees that, if the judgment of the House of Lords in the appeal in respect of the Southern Railway is carried to its logical conclusion, the approximate net annual values of the four railway companies for the five years ending March 31, 1936, would appear to be:—

	£
Southern Railway	1,100,000
London, Midland & Scottish Railway ..	2,500,000
Great Western Railway	1,300,000
London & North Eastern Railway	Nil

In view of the fall in the net revenue, the position for the period 1936 to 1941 is likely, it is said, to be much more serious. The rateable value would probably be a negligible quantity. The Executive Council of the County Councils Association has drawn the attention of the Ministry of Health to the gravity of the position with a request for immediate amending legislation and consideration of the action to be taken in regard to any

claim which may be made for repayment of rates for the five years ending March 31, 1936. Comments on this question have been made at recent meetings of various bodies. In a report of the proceedings at the annual meeting of the Association of Municipal Corporations on May 19 the following appears:—

A special committee on the valuation of railways presented a report detailing the history of the matter. It was stated that the various local bodies affected by the recent House of Lords judgment had arranged a further interview with the Minister of Health on the question of seeking Government legislation to ensure that proper valuations for rating purposes might be placed on the undertakings of the railway companies. The matter was left in the hands of the special committee.

At the annual conference of the National Chamber of Trade on May 19 a resolution was carried, urging a review of the derating provisions of the Local Government Act at the earliest opportunity. The mover of the resolution said that:—

the circumstances which existed at the time when the Act was passed had changed, owing to the imposition of protective tariffs and the reversal of the financial situation due to depreciated currencies. In addition, prosperous and sheltered industries had come in to enjoy the benefits of the Act, contrary to the original intentions of the Government. These inequalities should be removed, and prosperous manufacturing concerns should be made to bear their fair share of municipal finance.

At the same conference the President in his address said:—

The problems of rating were not confined entirely to the derating of industrial hereditaments. In view of the additional burdens passed by Parliament to local authorities, the way in which legislation had interfered with the principle of assessment for rates under the derating provisions, and the decisions respecting the liability of the railway companies where earning capacity had been recognised, the pertinent question seemed to be raised whether the time had now arrived for the whole basis of rating to be thoroughly investigated.

It would be interesting to have the Association of Municipal Corporation's definition of "proper" valuations. The valuations in question were recently made by statutory authorities and tribunals, and in accordance with established principles. Any new legislation cannot surely be confined to dealing exceptionally with the railways. It might even envisage the entire abolition of local authorities and local rates seeing that in this sphere the dictatorship is centred in Whitehall and half the total expenditure is borne by the National Exchequer.

* * * *

The New Southern Signalling

FOLLOWING our article last week on the constructional works involved in the comprehensive scheme for improving the lines approaching Waterloo, we describe in the present issue the new colour-light signalling installation which was successfully brought into operation on Sunday, May 17. The power signalling at the terminus is not included, for it will not be completed until after the summer traffic, and in the meantime the old mechanical Waterloo "A" cabin, itself one of the most interesting pieces of work ever done in signalling, continues to control the station itself and the approach thereto, in conjunction with four others as far as Vauxhall. So successful have been the previous power and light signalling installations in the London area and on the main Brighton line that the company has not hesitated to adopt the same general principles for this further work, rendered indispensable by the growing traffic and the necessity of handling it with the maximum rapidity. At the same time certain modifications of previous practice have been incorporated in it, the result of much discussion and careful planning by the company's officers. The traffic on these lines has long been heavy, but in recent years its growth, stimulated by electrification, has been remarkable. In common with that on many heavily worked London suburban sections the traffic has for many years been controlled by Sykes's lock-and-block. The L.S.W.R. introduced pneumatic signalling at Grateley in 1901, and shortly after also at Salisbury, Staines, and between Woking and Basingstoke, combined with track circuit and a number of automatic and semi-automatic semaphores. Later, the pneumatic system was chosen for the Clapham Junction area, but it was not continued into the Waterloo terminus, although we believe that was contemplated. The new work thus fittingly continues the policy of adopting the most up-to-date practices of signalling progress. The folding plate and diagrams we now publish will serve to show the extent of the new work and give some idea of the organisation required to carry it out without interfering with the existing apparatus, already functioning to capacity in the busy hours.

The signal aspects are generally in accordance with previous Southern practice as regards ordinary through movements, although the four-aspect signals have their lenses arranged in a slightly different manner, and the principles governing them are, of course, well known. At running and crossover junctions, however, splitting signals have given place to junction indicators of the position-light type. This is the first example of their use on such a scale and for such an intensive service. We understand that these indicators, first tried as a neon tube device in the North Eastern Area of the L.N.E.R., are likely to be agreed on by all the companies as the recognised method in future for multiple-aspect installations. The abolition of splitting signals offers several advantages from the signal engineer's point of view. It is often difficult to find room for the number necessary, and hence to place them in a position for maximum visibility. If brought close together there is a tendency for their lights to blend at a distance, and for a yellow one especially to overpower its neighbours. This has, of course, been one of the arguments of the advocates of the speed signal, with its one plain post at every location. The junction indicator has this advantage and at the same time indicates the route set up as unmistakably as splitting signals can. Its appearance is very distinctive and we understand that it has already commanded the approval of the drivers, who, after all, are the persons most concerned. Keeping the junction signal at yellow for diverging routes, except in the case where they allow of the authorised speed being maintained, assists in emphasising the message conveyed by the indicator. Whether it will have any retarding effect in foggy weather, due to slow running until the next signal is sighted, remains to be seen, but if it does, there should be no difficulty in providing a remedy.

Another interesting feature of the work is the repetition of all track-circuit sections in the cabins, with the provision of telephones at the signals, and the new proceed, or "P," signs. Some provision has always had to be made to enable trains to pass automatic signals at danger so as to prevent a defective signal holding up the traffic indefinitely, and the most usual arrangement has been to adopt, in some form, the Stop and Proceed Rule. Accidents due to want of care in carrying out this rule in some cases, and an unwished for accumulation of trains at one point, following congestion or obstruction farther on, have brought the subject under review, and the new arrangements are the result of deliberations between the companies and the Ministry of Transport. The effect is to make the automatic signals into absolute stop signals unless some signalman, who has a track indicator referring to the protected section, sees fit to make them otherwise. We are glad to note that the full responsibility

for proceeding carefully still rests with the driver, and we hope there will be no tendency for him to become less vigilant under the new arrangements. The working of these signals will certainly be watched with interest by signal engineers and traffic officers. Actual signal defects will, it is safe to say, occur only at rare intervals, and in most cases therefore a red signal will mean that a train is required to stay there. We imagine that the passing of signals at danger will very seldom be necessary, but when it is, the essential thing will be for the driver to realise the gravity of the position and, no matter what he is told by a signalman or anyone else, personally to see the way is clear in front of him and not on any account exceed the slow speed limit until he is out of the section of line involved. That appears to us to be the one fundamental thing without which no kind of apparatus can ensure security. No effort has been spared in the new installation to do everything that discussion and experience can suggest in these respects, and the result is one of the most complete and important pieces of signal engineering to be found anywhere.

* * * *

Recent Jugoslav Railway Developments

FROM its inception the new kingdom of Jugoslavia has been faced with the general improvement of its railway system, a collection of lines built up mainly by the former Austro-Hungarian Government on principles influenced by the political and economic aims of the former dual monarchy that do not always accord with those of the new kingdom. Considerable lengths of new line have also been necessary to open up and develop the country according to Jugoslav policy. Since 1926, for instance, the route length of the State system has increased by 634 km., almost all standard gauge, and now totals 9,551 km.: there are also 874 km. of line operated either by the Ministry of Forests and Mines or privately. During 1935 two new lines of considerable importance were opened: (*a*) connecting Veles with Prilep, 86 km. (53½ miles); and (*b*) the 24-km. (15-mile) Belgrade-Pancevo chord. (*a*) is of international standing, as it completes a second route into Greece and connects Skoplje and Bitolj on the Jugoslav side of the frontier, with Florina and Salonica in Greek territory. (*b*) on the other hand, includes a new bridge over the Danube, and gives direct access to Belgrade from the north and north eastern area of the Jugoslav State system.

Other important lines now under construction are Kosovo Polje—Pec (82 km.), and Pozarevac-Kucevo (86 km.). Both these are first sections of new international routes, Kosovo Polje—Pec being the first step towards Cattaro or Kotor, on the Adriatic, and forming a direct standard gauge outlet to that seaboard from Nish, Sofia and other Bulgarian cities, as well as from Bucharest and Roumania generally, via Turnu Severin, Prakavo and Nish, and, in fact, providing a trans-Balkan Black Sea-Adriatic trunk line. The Pozarevac-Kucevo is also the initial link in a new Jugoslav-Roumanian route, the junction point between the systems of the two countries being Turnu Severin. This, when completed, will give direct communication between Belgrade and the west with Bucharest and Constantza on the Black Sea. The present railway communications are either very roundabout, if of standard gauge, or limited in capacity by narrow gauge, and the new routes will provide comparatively rapid transit, that to the Adriatic being specially important. A further inducement to construct this line onwards from Pec to Cattaro is the diversion of the mineral products of the Trepca mines, in which British capital is invested, from the Salonika to the Cattaro route. On the other hand the financial resources of Jugoslavia are already strained, and funds are likely to be available only from foreign loans or some other extraordinary source.

Meanwhile, improvements in the existing system are proceeding apace. Doubling of lines, rebuilding of bridges and tunnels, relaying and the renewal of telegraphic and telephonic installations are among the most important measures being taken. Up to the present time only about 7 per cent. of the standard gauge system has been double-line, but now the Zagreb-Zidanimost, Zagreb-Novska, and Belgrade-Skoplje sections are being doubled. Several timber viaducts have been replaced by masonry and steel girder structures, and in many tunnels the old arching has given place to concrete reinforced with old rails. In the track 60-lb.-70-lb. rails are being removed to make way for 80-lb.-100-lb. material: 500 km. of new telephone or telegraph lines have been erected during last year, and the telephone block system rehabilitated. Signalling, on the other hand, has not received the attention it merits, due to lack of funds, even though this still entails low speeds of all services, including the Simplon-Orient express. However, there has been considerable activity in the direction of rolling stock renewals and improvements. The former include the recent addition of 15 heavy, and the ordering of 10 more light locomotives: to improve local services orders have also been placed for six diesel railcars. Some 350 standard gauge goods wagons have been fitted with air brakes, and 50 with steam heating also, while 250 narrow gauge goods vehicles have been equipped with the Hardy vacuum brake: passenger stock has neither been improved nor increased appreciably, though large numbers of cars and locomotives had to be scrapped a few years ago. On page 1030 will be found a sketch map to indicate the principal places mentioned in this brief review of recent Jugoslav railway activities. Those during 1935 are also referred to on that page.

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Railway Journal Bearing Research

THE laboratory facilities at a well-known plant in the United States have recently been extended to include equipment for much needed research and development work on the mechanical function of design, and the application of bearings and bearing metals in railway service. The physical laboratory contains an appliance known as the Loadometer testing machine, equipped with a standard 5-in. by 9-in. railway axle mounted on wheels and driven by a 200-h.p. motor, with controlled speeds up to 50 m.p.h. Through the superstructure of this machine, provision is made by means of an hydraulic jack for applying loads up to 50,000 lb. distributed to the two journals via an overhead floating beam. With this arrangement it is possible to make simultaneous tests of two different bearing assemblies under identical conditions. A standard axlebox and bearing with conventional waste packing can be assembled on one end of the axle, and any other bearing unit desired on the other end, and from these tests the operating characteristics of both types of bearings can be compared with regard to load factor, efficiency of lubrication, and temperatures developed. Accurate recording instruments keep a continuous check on temperatures of both bearings and lubricants at different speeds and loads, as well as on variations in axle diameter and bearing fits. To ensure true results the comparative tests are repeated several times to compensate for variations, thereby making it possible to obtain representative data on the different bearing units.

THE SCRAP HEAP

Unwanted London tramcars displaced by trolleybuses are sold to wreckers. Last week another batch—numbering 130—was bought by George Cohen & Sons Ltd., of 600, Commercial Road, E.14. The old cars will be broken up and the metal melted.

* * *

SEEING SNAKES

Hurrying down the steps of the subway leading to the Monument underground station, a man dropped a brown-paper parcel. It fell open, disclosing a writhing mass of live eels, which slithered and squirmed down the steps to the alarm of some spectators and the amusement of others. If Billingsgate provides many more such shocks an increase in the numbers signing the pledge in the vicinity is prophesied.—*From the "News Chronicle."*

* * *

The following is believed to be a perfectly serious tale, vouched for by a senior retired Indian railway officer at the State Railways annual dinner on May 25. The engineer in charge of a party, surveying a new line through the jungle in Mysore State, was superintending the chaining. One chainman had let go his end of the chain, and the other was dragging it along the trace, when there was a sudden check. Investigation showed that two tiger cubs were playing with the loose end of the chain, an animated and attractive toy.

* * *

Mr. S. Uchida, the Railway Minister, is a man eminently capable of springing stunts. A bathroom on wheels was to be one of his surprises. The innovation disappeared, however, as soon as it was put in motion. It didn't take long for the travelling public to see trouble in the mobile bathroom hitched up to the tail of an express train. They remembered how persons wanting to get off at Osaka had a way of relaxing themselves in the steaming atmosphere of abandon so much that they often found it too late to hustle on their clothes, collect other belongings, and clear out at the right place at the right time. Complaints followed thick and fast until they sent the novelty to the scrap heap of bright failures.—*From the Asahigraph Overseas Edition.*

* * *

HOW TO RESERVE A COMPARTMENT

An enterprising American firm, says a German railway journal, is offering a remarkable novelty to railway travellers viz., "squealing dolls," intended to keep the nervous and baby-haters out of a carriage. "After many years of constant labour," says the circular of this astute firm, "we have succeeded in constructing dolls which will squeal like babies. We can guarantee that no other traveller will enter a carriage with one of our A1 dolls when wound up, and we recommend those who wish to travel in comfort and alone immediately to procure one of them. The price of one of our A1 babies, with a loud persistent squeal, increasing in force, broken with fits of rage, is $10; that of No. 2, with a steady irritating sobbing, $5; whilst No. 3, which from time to time emits terrible screams, and can easily be stowed in the coat pocket, is $2½." Surely such an enterprising firm deserves success.—*From "The Railway News," September* 15, 1888.

* * *

Lack of capital was a very common complaint on some of the early American railways, and it is amusing to read of the impecuniosity to which some of the lines were reduced. There is, for example, an account of an employé of the Philadelphia & Gormanstown Railway who was obliged to buy with his own money grease to oil the axles of the train. An old engineer on a New England road relates "how men were sometimes put on the tender, with a saw-horse and saw, to cut the wood for raising steam for the trip, because there was no supply on hand, and no money or credit to buy any." On another occasion it is said that an official had to give up his gold watch as security when a train whilst en route was seized for debt. Receivers' certificates had not been invented in those days, and when freights were bad there was no credit basis, and the companies had to live from hand to mouth.

* * *

ALL STEEL

"*It moves, for all that,*" said Galileo, hauled before the Inquisition and made to deny publicly that the earth went round the sun. In time it was accepted. Those that argue for steel instead of wooden railway coaches may feel a little like Galileo, though they have not had to recant their belief. After hearing first that railway coaches always HAD BEEN wooden, next that steel was more dangerous than ever *since it resisted pressure,* and third that steel had been tried and found wanting, you read this morning that the L.M.S.R. will put nineteen all-steel electric trains on the rails. It moves all right, the all-steel idea . . . but how fast?—*From the "Daily Express."*

* * *

RELIC FOR YORK RAILWAY MUSEUM

By courtesy of the West Riding Asylum Board an interesting relic has just been secured for the Railway Museum at York. In years past a colliery railway ran across certain land now in possession of the board to connecting long worked out collieries on the Wakefield-Leeds road with the River Calder at Stanley Ferry. This line has been abandoned for many years, and it was recently found that one of the original stone sleepers together with the cast iron chair attached thereto had survived the ravages of time and weather. The matter was brought to the notice of Mr. D. Gracie, L.N.E.R. District Superintendent at Leeds, who, realising the value of this relic, took the matter up with Mr. Burton, of the West Riding Asylum Board. Mr. Burton's sympathetic interest in the preservation of this old relic led to the matter being submitted to the board, with the result that Mr. Gracie was given permission to remove the sleeper, and it was sent to York on Saturday last, where it will occupy an honoured position in the Railway Museum.

* * *

During the demolition of an old farmhouse at Swanley, the railway ticket which we reproduce was found lodged between the brickwork of an ancient fireplace. As will be seen, the ticket was issued by the London, Chatham & Dover Railway in 1867, at

Old ticket recently found at Swanley

which time Swanley Junction was known as Sevenoaks Junction. The ticket is now in the possession of a Southern Railway guard, and we are indebted to the editor of the *Southern Railway Magazine* for the illustration.

* * *

LONDON & SOUTH WALES RAILWAY

A Bill for the construction of a proposed London & South Wales Railway was deposited in the Session of 1896, but beyond the initial deposit no steps were taken to proceed with the Bill in Parliament. The Bill sought to incorporate a number of persons—principally South Wales coal owners—into an undertaking to be styled the London & South Wales Railway Company and to empower them to make a railway, approximately 120 miles long, commencing by a junction with the Barry Railway near Cardiff and terminating by a junction with the Metropolitan Railway at Great Missenden. Various branch lines were proposed, to connect with the Great Western, Taff Vale, Cardiff, Brecon & Merthyr, Midland, and Midland & South Western Junction Railways; and among the working agreements contemplated was one to authorise the proposed new company to work over and use the authorised extension of the Manchester, Sheffield & Lincolnshire (afterward the Great Central) Railway, then in course of construction, including the Marylebone terminal station of that company in London.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

INDIA

Railway and General Finance

Sir Otto Niemeyer's report on the allocation of finances between the Central Government and the Provinces under the new constitution makes important reference to the financial position of the Indian railways. Sir Otto observes that it is unnecessary to contemplate any serious increase in the total expenditure of the Central Government unless the Railway Budget, contrary to expectation, fails to improve; but he considers the position of the railways disquieting. The report says that it is not enough to contemplate that in five years' time the railways may merely cease to be in deficit: such a result would tend to prejudice or delay the relief which the Provinces are entitled to expect. Sir Otto Niemeyer believes that both the early establishment of effective co-ordination of the various modes of transport, and the thorough overhaul of railway expenditure are vital elements in the whole problem. The position of the railways, therefore, during the next five or ten years is a factor that may upset the financial structure which Sir Otto has devised for the Provinces and India generally.

Outlook Officially Considered to be Brighter

In official circles, the possibility of the railways failing to meet their total expenditure either from revenue or from their own reserves is considered to be remote. A saving of about Rs. 6½ crores in working expenses has already been achieved, and further measures of economy are steadily pursued. Railway receipts are expected to improve both by the amelioration of trade conditions and by the selective increase of rates and fares. The difference between the annual appropriations to, and expenditure from the Depreciation Fund lends colour to the view that the provision under depreciation in the working expenses can be substantially reduced, at least during the lean years. There is also the probability that the forthcoming meeting of the Transport Advisory Council at Simla, in July next, will reach some agreement in the matter of co-ordination of road and rail transport, as the realisation is at last dawning upon provincial interests that the Central Government's contributions to the Provinces under the Niemeyer report must depend largely upon the state of railway finances which, in turn, are prejudiced by serious road competition. All these factors considered, there is no reason to envisage the future of Indian railways as a charge upon the central revenues. It is, nevertheless, held in responsible quarters that railway expenditure has to be further curtailed if the railways are ever to be in a position to renew payments to the general exchequer.

Howrah Bridge Contract

The Bridge Commissioners have now decided that the two sets of estimates (*a*) based on the official design of the new Howrah Bridge, and (*b*) on the alternative design submitted by the Indian combine (Braithwaite, Burn and Jessop) are to be placed before an independent board of engineers consisting of Mr. Adams Williams (formerly Chief Engineer, Irrigation, Government of Bengal), Sir George Humphreys (Past-President, Institution of Civil Engineers), Mr. Stewart (Chief Engineer, Calcutta Improvement Trust) and Mr. H. W. Robinson (Deputy Chief Engineer, Bridges, North Western Railway). With their wide technical experience, these engineers will form a competent body to express an authoritative opinion on the merits of the modified roadway and shorter span suggested by the Indian combine with a view to economy in construction.

Mileage Coupon Tickets Re-introduced

From May 1, first and second class mileage coupon tickets have been reintroduced on most railways and are now available for journeys over the East Indian, North Western, Great Indian Peninsula, Bombay Baroda and Central India, Eastern Bengal, Madras and Southern Mahratta, South Indian and Nizam's State Railways both in local and through booking. Each coupon book contains tickets covering 3,000 miles, and the price is Rs. 280 for first class and Rs. 140 for second class: the mileage coupon system is particularly helpful to firms employing commercial travellers. The Bengal-Nagpur, Bengal & North Western, and Assam-Bengal are the principal railways that have not joined in this measure for facilitating commercial travel, now uniformly adopted by the State-worked systems.

Proposed Diesel Units for Calcutta Suburban Service

It is understood that the Eastern Bengal Railway administration has under consideration a proposal for the introduction of small diesel-electric units on the Budge Budge suburban section. If the investigations that are pending prove the scheme to be financially sound, a notable improvement will be achieved in the transport arrangements for the south suburban section. A fast and frequent service will bring these areas within easy reach of the city, and the special arrangements proposed by the administration to meet the morning and evening office rush will be welcomed by the daily passengers.

NEW ZEALAND

Future of Railway Transport

The Railways Bill now before Parliament is stated by the Prime Minister, the Hon. M. J. Savage, to open up bigger possibilities of railway developments in national transport than appear on the surface. "The Bill," said Mr. Savage, "deals with the whole question of railway construction and removes the barriers that exist between the Government and the carrying out of its policy. The board will not then be responsible. The responsibility will be with the Minister, and as soon as the Bill is passed we will be ready for action, and the East Coast railway will be started as rapidly as we can get into it. Subsequently we will handle the South Island Main Trunk line, but we must begin at Gisborne."

Railway Policy

The Minister of Railways, the Hon. D. G. Sullivan, states that he is perfectly satisfied that the resumption of full control of the railways by the Government is in the best interests of the people of the Dominion, and that the Government should take full responsibility for its policy without sheltering behind allegedly independent boards. He further states that not the slightest reflection is intended against any member of the Railways Board. It is the system which is at fault.

"No truly democratic Government could possibly function as it should in conducting the affairs of the railways if the Government on the one hand and the management on the other were to attempt to continue their work subject to mandated authority such as that with which the Railways Board is invested," said Mr. Sullivan.

The General Manager's Comments on the Change

The change, as part of the new Labour Government's policy, has drawn some interesting comment from the General Manager, Mr. G. H. Mackley. He states that when the projected change was announced, the press of the Dominion seemed to be unanimous in giving credit to the influence of the Board for the improvement in the quality of service rendered by the Railway Department during recent years. Continuing, he said:—

As head of the Railways Department and without wishing to take away anything from the board, I am impelled to say that the whole of the credit for the quality of service given to the public in recent years should go to the staff of the department who, from one end of the Dominion to the other, have responded so well to the frequently expressed desire of the management, that the quality of service rendered to the public might be as good as it was possible to give in every circumstance, and fully worthy of this great

Department of State and of the people of the Dominion. In this statement of the position I am sure individual members of the board will agree, and would be the first to disclaim any credit for the improvement referred to.

Hence I have no hesitation in assuring the patrons of the railways and the general public, again on behalf of every member of the department, that the standard of service, regarding which so many favourable comments have been made, will be fully maintained in the changed conditions, and that wherever possible it will be still further improved.

The members of the service, as is only natural and in duty bound, have the utmost goodwill towards the patrons of the department, who really constitute the whole of the public; and even that goodwill, translated into terms of service, cannot fail to be enhanced as a result of the expressed intention of the Hon. Minister of Railways and the Government, to see that the railways obtain fair treatment and better recognition of the value of the work they are performing and are designed to perform in the general transport interests of the country.

VICTORIA

New Melbourne Boat Train

A new special boat train—painted bright blue with silver roofs and consisting of six coaches—has been placed in service between Flinders Street and Port Melbourne pier. It is now in regular use for the conveyance of passengers to and from ocean liners, and its bright livery and smart appearance create a favourable impression upon arriving tourists.

Small Petrol Railcars

The Department has purchased six Dodge LE. 30 motor chassis fitted with six-cylinder 23·44-h.p. engines, on which railway-built bodies and steel flanged wheels are to be fitted for railcar services. They are to accommodate six passengers and a driver, as well as mails, parcels and luggage, and are intended for service on the Ararat-Avoca, Horsham - Goroke - Kanagulk, Birregurra-Forest, Irrewarra-Cressy, Shepparton - Dookie, and Donald - Woomelang-Mildura sections. The cars will be fitted with special turning mechanism, and will provide greatly improved services.

Automatic Couplers

Since the introduction of automatic couplers in 1926, the following locomotives and vehicles have been fitted with them: locomotives, 271; carriages, 283; wagons, 15,044; vans, 592. These modern automatic couplers are nearly five times as strong as the old type screw couplings, and as a result of their adoption on goods stock, train loads have been limited practically only by the tractive power of the locomotives. They are thus a highly important factor in the movement of substantially increased train loads. Combined with the improvements in brake equipment, the automatic couplers have greatly reduced the possibilities of damage to rolling stock and merchandise in transit. Of major importance, too, is the greater measure of safety that is provided. There is practically no risk of broken connections resulting in "breakaways" or "parting" of trains. Where carriages have been fitted with automatic couplers, the riding qualities have been considerably improved by the elimination of "slack" action between the vehicles. As a result of their success, it has now been decided to fit automatic couplers to all Victorian and South Australian joint coaching stock.

JUGOSLAVIA

Developments during 1935

During 1935 a further 241 km. of line have been added to the standard gauge (4 ft. 8½ in.) section of the State Railways system and the doubling of three important lengths of line Zagreb-Zidanimost, Zagreb-Novska, and Belgrade-Skoplje has been undertaken. Also 300 km. of 60-lb. to 70-lb. rails have been replaced by 80-lb. to 100-lb. sections, and 500 km. of new telephone and telegraph lines have been erected during the year.

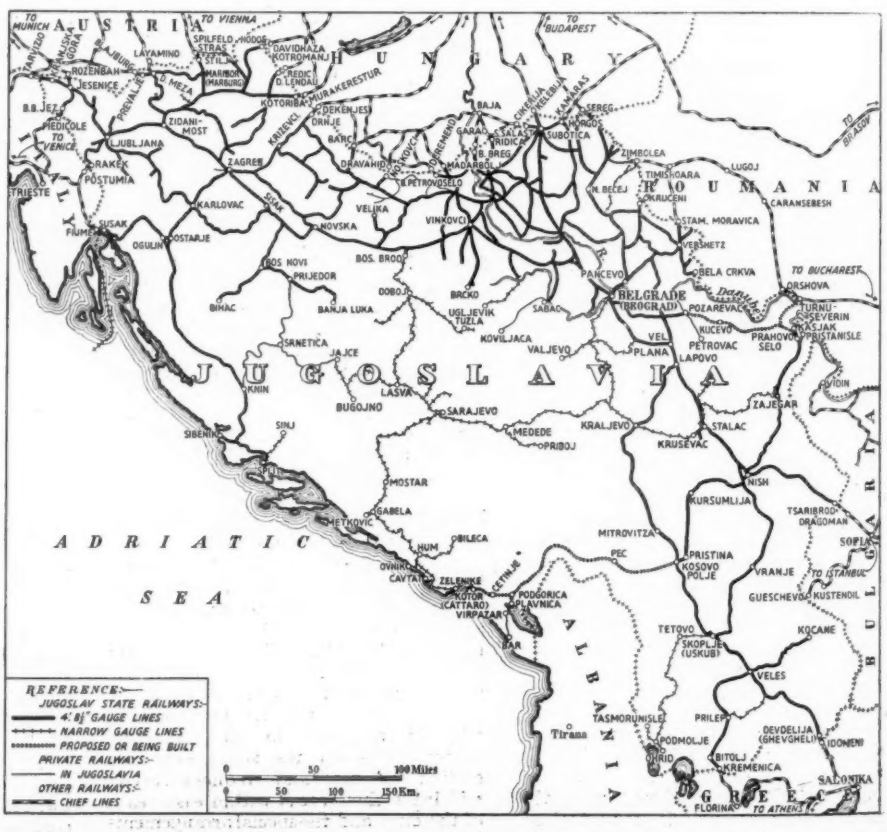
New Line Completed

A line of considerable importance from the international point of view that has been opened during last year is the Veles-Prilep link 86 km. (53½ miles) in length, connecting Belgrade, Kraljevo, Kosovo, Skoplje, and Bitolj on the Jugoslav side of the frontier with Florina and Salonica in Greece.

Another line opened last autumn is the connection between Belgrade and Pancevo, with its new bridge over the Danube. This links up the sections of line in the north with those in the south via Belgrade. [The bridge was illustrated and briefly described on page 1104 in our issue of December 27 last. —ED. *R.G.*]

New Constructions in Hand

In addition, the following lines are still under construction: (*a*) Kosovo Polje-Pec in the south-west—the first step towards the new Adriatic terminal at Cattaro; and (*b*) Pozarevac-Kucevo, which is eventually to be carried on to link up with the Roumanian system at Turnu-Severin. [See sketch map below. The eventual connections made by these new routes are outlined in our leader on page 1027.—ED. *R.G.*] Each forms the first link in a new through route of international importance, but



Sketch map of the railways of Jugoslavia and neighbouring countries

without the completion of the remainder of that route is of little use commercially or politically by itself.

SPAIN

The Andaluces Railway

The *Madrid Gazette* of May 12 publishes a Decree, dated May 9, authorising the Minister of Public Works, under Article 36 of the 1877 Law, to take over—in the case (considered to be imminent) of the company abandoning the railway, or of a complete or part stoppage of the service—the system of the Andaluces Railway Company. Provision is made in the Decree for the working of the railway by a committee formed by the present administration of the National Western Railway, and also for the presentation to the Cortes of a Bill for the necessary supplementary credits for working the railway and for covering the deficit if any.

According to the Madrid press the Andaluces Company owes the Peñarroya mines four million pesetas for coal, and as the mining company has declined to give further credit, the miners are working short time and have announced a strike. The Government is already giving the Andaluces Company advances to enable it to pay the annual bonus of one month's pay to its staff.

The Company's Difficulties

The company has been in difficult circumstances for some time and has not been able to meet its financial charges since 1930. The magnificent network of roads constructed by the Government of the military dictator in the last decade deprived the company of much of its traffic. Also recent concessions resulting from advanced social legislation have added to the impossibility of reducing staff in relation to the diminished traffic, since railway employees have now been conceded a fixity of tenure usually limited to civil servants. These are the principal causes that have combined to increase working expenses to such an extent as to bring the whole economic structure of the company to the verge of ruin.

The National Western Railway was formed to take over the Madrid, Caceres & Portugal Railway, which was regrouped with several other small lines, to form a new system on a "mixed" basis, that is, a sort of corporation, worked on the lines of a private company, but with State capital and intervention, and with the losses, which last year amounted to about three million pesetas, guaranteed by the State. Presumably the Andaluces system, if and when taken over by the State, will be run on a similar basis.

The Gibraltar Tunnel

On May 12 a film was shown at a leading Madrid cinema to demonstrate the work carried out by the commission charged with the study of the scheme for a tunnel under the Straits of Gibraltar. The geological history of the formation on each side and under the straits, and the work of boring and exploring, were clearly shown by the film, which purports to demonstrate the possibility of the tunnel, and the great advantages to international transport and travel to be gained by its construction. The advance estimates total about 350 million pesetas (nearly one million pounds sterling), and it is assumed that a great part of the capital would be forthcoming in Spain, with contributions from other countries.

SWEDEN

Finances of Privately-Owned Lines in 1935

The following table shows the financial position of the Swedish private railways taken collectively:—

	Gross receipts Kr.	Working expenses Kr.	Net receipts Kr.
1934 ...	112,980,000	86,060,000	26,920,000
1935 ...	116,910,000	90,760,000	26,150,000

Both passenger and goods gross earnings showed improvement, the former by Kr. 1,050,000 and the latter by Kr. 4,700,000.

After deducting interest and writing off various items, the aggregate net profit was Kr. 6,880,000, as compared with Kr. 7,070,000 in 1934. Actually these figures are compiled from 92 railways, and may, therefore, be misleading in many instances, as 41 of them showed a net profit and not a loss, the other 51 showing a loss.

New Restaurant Car Organisation

The restaurant car services on the Swedish lines are at present administered by the Tourist Association Refreshment Company, the agreement with which expires at the end of 1938. Notice of intention not to renew it has duly been given. From that date the service will be transferred to a new concern, the shares in which will be held by the State Railways, or jointly by them and the Swedish Transport Association, so strengthening the State holding. The shares of the present undertaking are owned by the association and private individuals. The existing agreement provides that the State Railways shall receive 50 per cent. of the net profit from the restaurant cars, and the Transport Association, in addition to any dividend due, receives Kr. 65,000 annually in return for its work in encouraging the foreign tourist traffic.

The reason for the change is said to be the conviction, held by the authorities, that the State Railways are not receiving a reasonable share from the car services under the present system. The present company dates from 1909; its capital is now Kr. 375,000, and it has paid a good dividend for many years. The company operates all the restaurant cars on the State lines, with the exception of the Uppsala-Gävle route (where the proprietor who owned the service when the line was in private hands still carries it on), and on two private lines, as well as the restaurant service on the ferry-boats and at a number of stations.

MANCHUKUO

South Manchuria Railway Policy

The Japanese Finance Minister has approved the terms of the new 60-million Yen (£3½ million) S.M.R. loan. The rate of interest will be 4·3 per cent., the loan will be issued at par and will be redeemable in 13 years.

Mr. Matsuaoka, the President of the S.M.R., stated before leaving for Tokyo, that the company intends to build an experimental plant for extracting oil from coal at Anshan, at a cost of 16-million Yen (approx. £9½ million). Another project under contemplation is the harnessing of part of the Yalu river on the border between Manchukuo and Korea for generating electricity.

With regard to the unification of the operation of the railways in Manchukuo, Mr. Matsuoka stated that, financially the S.M.R. will remain entirely independent of the State Railways. Losses on new lines in the initial periods of their operation are being borne by the Government: on the other hand from 10 to 15 million Yen are being saved annually by the unification of the management under the S.M.R.

CHINA

New Suiyuan Extension

A new extension of the Peiping-Kalgan-Suiyuan Railway, beyond the present Paotou terminus, is to be constructed westwards to Wuyuan, a distance of 110 miles.

Kiaochow-Tsinan Railway

According to the *Shanghai Sunday Times*, China is preparing to redeem the Kiaochow-Tsinan railway from the Japanese by paying $40,000,000. Dr. C. T. Wang, Chairman of the Foreign Affairs Experts Committee and a former Minister for Foreign Affairs, has been entrusted with the mission of redeeming the railway, which Japan bought from Germany many years ago, but which is now declared a Chinese railway as a result of China's participation in the Great War. The Sino-Japanese agreement mortgaging the railway to the Japanese is due to expire in 1937, and, as the date of redemption is approaching, negotiations are in hand concerning the necessary funds. The agreement was signed after the Washington Conference.

Construction work is to be commenced in July on the extension of the Kiaochow-Tsinan Railway into Honan. This 140-150-mile line will form a direct connection with the Peiping-Hankow railway. Flood refugees and soldiers will be employed in the work. The new line will facilitate the development of Shantung, Hopei and Honan, affording direct access to the port of Tsingtau.

SECOND THOUGHTS ON THE ROAD TRAFFIC ACTS

Their effect on road transport

IN a paper given to the Institute of Transport in November, 1932, Mr. E. S. Herbert reviewed the working of the licensing system set up under the Road Traffic Act, 1930, and on Friday last the paper he presented at Birmingham to the annual congress of the institute was in effect a continuation of the former paper, bringing it up to date in the light of subsequent events. In 1932, when the first paper was delivered, the position with regard to private hire, or contract carriages, was most unsatisfactory. The Traffic Commissioners in some areas set about the task of devising a suitable form of licence. In other areas they took the view that it was impossible to frame a satisfactory form of licence, and that the solution lay in further legislation re-defining contract carriage work. Eventually licences with certain conditions were evolved; they pleased neither party. The contract carriage operators maintained that they did not give sufficient scope for the elasticity which was an essential part of private hire work. Stage carriage operators on the other hand complained that the conditions of these licences would permit the private hire operator to do much more than legitimate private hire work. Both sides appealed against the conditions of the licences and lengthy hearings took place before the Minister of Transport. Eventually, by Section 25 of the Road Traffic Act, 1934, amendments were introduced into Section 61 of the Road Traffic Act, 1930, which provided that in effect a contract carriage should not cease to be such if separate payments were provided, provided certain conditions were complied with.

Mr. Herbert also referred to the growth of extended tours or "land cruises" and to a further development known as "fantail tours." It was found that passengers became tired of moving constantly from place to place, and in many instances preferred to be carried to their destination, accommodated in hotels, left free on certain days to pursue their own devices, and on other days to be taken for excursions in the districts of the destination by means of the vehicle which had brought them there. The fantail tour presents special difficulties to the licensing authority. It is claimed that the business of the fantail tour operator is carved out, as to part, from the business of the railway companies or long distance express carriage operators, and, as to part, from the business of the local operators at the destination. Partly owing to lack of co-ordination between the commissioners of the area where the tour starts and the commissioners of the area in which the destination is situated, this type of operation has grown up without much detailed consideration. On the matter being brought to the Minister on appeal last autumn he decided that the fantail type of operation required closer consideration and control and left it to the commissioners to reconsider the matter in the light of this conclusion.

There is much to offset the benefits operators have received from the licensing system. Its rigidity and its deficiencies in dealing with co-ordination in other forms of transport weigh heavily upon operators, and the system has, on the whole, by restricting development, harmed rather than helped them. Subject to this general consideration the smaller operator has been the greatest gainer by the new system. It is not often realised what a number of small operators there are. About 40 per cent. of all operators have only one vehicle each, and 80 per cent. have less than five vehicles each. Outside London there are about 40,000 vehicles owned, of which some 12,000 are owned by operators owning less than 10 vehicles. It appears that in urban areas where large stage carriage operation is necessary, the smaller operators have tended to be absorbed by larger operators, whereas in rural districts, they have remained well established, and in excursion and tour work and private hire work they have great advantages. Prior to the Act there were many forced sales, and many small operators were forced off the road altogether. Today, a small operator if he wishes to sell out, is in an infinitely stronger position than he ever was before. The railway companies have gained from the Act rigid protection against the development, and even the continuance in full form of competitive services. The practical effect of the working of the system has been, speaking very broadly, to restrict road services to routes served five years ago with minor extensions. The railways have also been able to prevent any reply by the road passenger transport industry to the introduction of the summer ticket now made permanent as the monthly return.

The proportion of cases contested before the commissioners has been greatly reduced, but the contested cases have become heavier and more complex each year. A valuable reform would be to extend the period for which a road licence is current from one year to three years. The principal objection to extension of the period of a licence would be the necessity of more applications during its currency for variation of conditions in order to adapt the service to changing needs. The result of the prolonged hearings of the series of appeals relating to picking up places in the London area has been a considerable relaxation of the original conditions. The present procedure on appeals is for the Minister to depute an independent person to hold an inquiry into the appeal. A report, containing recommendations, is made by that person to the Minister and is available to the parties. The Minister does not differ from these recommendations in giving his decision without indicating his reasons to the parties. This is an important safeguard and the present system should be continued rather than that appeals should go to an independent body.

As to co-ordination of road and rail, prior to 1931 many long distance services by road had been established, and most of them during the first two years of the licensing system, were licensed in spite of almost universal opposition by the railways. After two years, the railways appealed to the Minister and asked for some of the longest of these services to be abolished. The Minister felt unable to abolish these services but laid down a general rule that the total number of vehicles run on any day should not be more than four times the minimum number of daily departures run throughout the year. Exceptions were made in cases of an "excursion, touring or primarily holiday character." With one slight technical change this rule has been rigidly applied for the protection of the railway companies, irrespective of the merits of any particular case.

In the matter of passenger fares the railways have, in practice, complete freedom of action as to reductions. On the other hand, the fares on all stage and express carriage services are directly controlled by the Commissioners who have power to attach conditions securing that the fares shall not be unreasonable, and also have power to fix maximum and minimum fares to prevent wasteful competition with other forms of transport.

IMPROVING THE APPROACH TO WATERLOO—II

The new signalling installation of the Southern Railway between Waterloo and Hampton Court Junction incorporates several interesting features

THE increasing traffic having made it necessary to adopt every possible means of shortening the headway between trains the Southern Railway decided to instal multiple-aspect colour light signalling from Waterloo to Hampton Court Junction, in connection with the alterations described in last week's issue. This type of signalling had already proved very successful on several sections in the London area and on the main Brighton line below Coulsdon, as described in our special supplements of July 22 and December 30, 1932.

The apparatus adopted for the present work is substantially the same as that used on the Brighton line, with a few modifications rendered necessary by the local conditions or suggested by experience. Owing to the temporary retention of mechanical signalling at and in the immediate vicinity of Waterloo, as seen on the accompanying diagram, until after the summer traffic is over, the light signals begin and terminate near there on the various lines at the most convenient change-over point for the time being. They were brought into use thence as far as Malden on Sunday, May 17, and will be extended to Hampton Court Junction on June 28, which will enable a number of signal boxes to be closed and certain economies to be realised.

Sykes's lock-and-block has been used, with remarkable freedom from mishap, on all these lines for over 40 years, but manual working is now no longer capable of dealing efficiently with the rapid sequence of movements called for by the increasing traffic. Power signalling has been in use at Clapham and West London junctions for about 25 years, originally on the low-pressure pneumatic system, but subsequently altered to electro-pneumatic by the company. Electro-pneumatic operation of points is being retained there, but one cabin, at the western end of Clapham Junction, has been abolished and new all-electrically locked power frames have been installed in two others, incorporating the most modern improvements, the old frames of the pneumatic slide type, of which there were separate ones for the main and Windsor lines, being abolished. It was, we understand, at first suggested to retain them and add certain apparatus to meet the new requirements, but on investigation this did not prove an economic proposition.

Arrangement of Sections

The block sections have been carefully laid out to afford the best possible headway, as required by the Traffic Department, and at the same time afford the necessary interlocking protection where points and crossings occur. From Hampton Court Junction to Clapham Junction "A" box there are ten automatic signals on the up through line and two semi-automatic, nine automatic signals on the up local line and three semi-automatic; from Queen's Road to Waterloo there are two automatic signals on both the up Windsor local and up main through, three on the up Windsor through and four on the up main local. In the down direction there are four automatic signals on the down main local between Waterloo and Clapham Junction, as well as on the down main through, down Windsor local and down Windsor through. From Clapham Junction to Hampton Court Junction there are eleven automatic signals and one semi-automatic on the down local and down through lines, with one automatic signal on the down Hampton Court line beyond Surbiton station. The remainder are controlled signals. This station is being reconstructed, with a new signal box, and the Marsh Lane box will be retained in service until the work is completed.

Continuous alternating current track circuiting is provided throughout, a total of 70 track miles, the average length of the track circuits on the open line being 750 yd. Rolled-section insulated rail joints are used on many track circuits, as they dispense with all insulating collets in the rails and hence avoid enlarging the rail holes, while they can be bolted tightly against the rails without damage to the insulations. The main signal supply circuit is at 220 volts, 75 cycles—instead of the 440 volts, 50 cycles, of the Brighton line—taken from 3,300 to 220 volt transformers at 10 points along the route, the supply coming normally from the sub-station at Lewisham, with an alternative feed from Durnsford Road power-house as emergency stand-by.

Signals

The signals, which are fitted with side lights, mostly have three or four aspects, with separate lenses for each colour unit, according to the requirements at each location, but for entering loop sidings from the running line

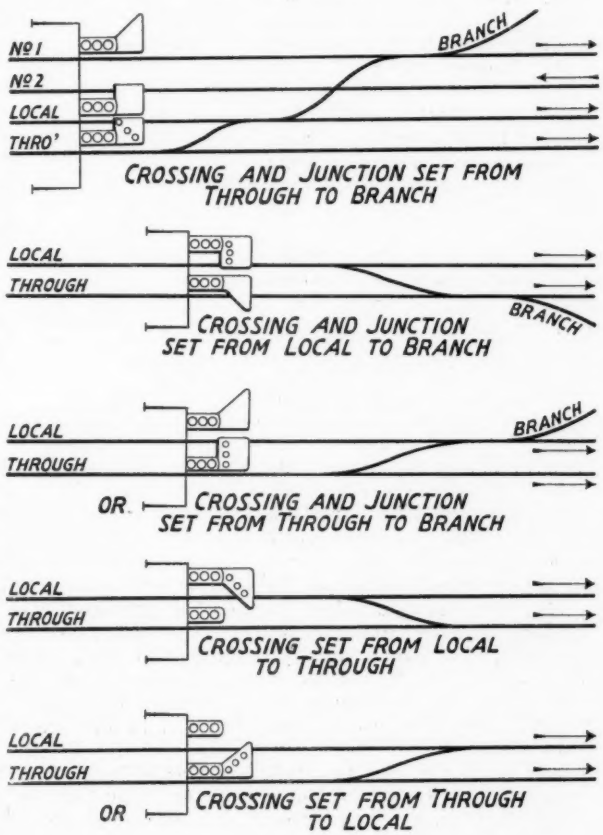


Fig. 1—Examples of application of junction indicators

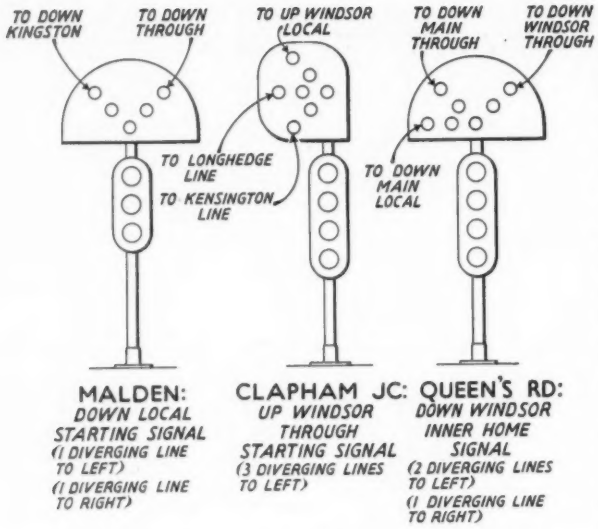

TO DOWN KINGSTON
TO DOWN THROUGH
TO UP WINDSOR (LOCAL
TO DOWN MAIN THROUGH
TO DOWN WINDSOR THROUGH
TO LONGHEDGE LINE
TO KENSINGTON LINE
TO DOWN MAIN LOCAL
MALDEN: DOWN LOCAL STARTING SIGNAL (1 DIVERGING LINE TO LEFT) (1 DIVERGING LINE TO RIGHT)
CLAPHAM JC: UP WINDSOR THROUGH STARTING SIGNAL (3 DIVERGING LINES TO LEFT)
QUEEN'S RD: DOWN WINDSOR INNER HOME SIGNAL (2 DIVERGING LINES TO LEFT) (1 DIVERGING LINE TO RIGHT)

Fig. 2—Examples of actual junction indicators

in the facing direction small two aspect signals are used. Three aspect signals are arranged as before, but the four aspect type have the red lens at the bottom, then, reading upwards, a yellow, a green and a yellow. Shunt signals are of the disc form, consisting of a red horizontal bar on a white enamelled background moved to 45 degrees when cleared and are floodlighted. Coloured lights are thus confined to running signals, which avoids the possibility of confusion arising from the same colour having a different meaning in the two classes of signal.

Junction Indicators

Hitherto in its colour-light installations the Southern Railway has adopted splitting signals for running and cross-over junctions but in this installation it has adopted for the first time the position light junction indicator. At junctions it makes possible the elimination of many signals for which it would be difficult to find space, and simplifies the driver's task in picking out his signals. The principle of the indicator consists in displaying above the colour light signal a row of three lunar white lights on either side of the centre line of the signal aspect, as the circumstances may require, beginning at 45 degrees from the vertical for the first diverging line, horizontal for the second and 45 degrees beyond that for the third. This arrangement thus enables six diverging routes to be signalled, three on either side of the straight line—for which no junction indication is given—but three is the maximum number of divergencies so signalled in the present installation. The accompanying diagrams (Fig. 1) issued with the company's official instructions show the principle of these indicators, while Fig. 2 illustrates three actual examples.

Double filament lamps are used, 12-volt 10-watt in the main filament and 16-volt 6-watt in the auxiliary one. There are 48 indicators in all. The control circuits for signals reading over junctions are so arranged that in the case of all except five signals west of Queen's Road, the indication remains at red when a diverging route is set up, until the approaching train is on the track circuit in the rear of the signal, which can never in any case show more than a single yellow indication except for going from down Windsor to down Windsor through at Queen's Road, where the layout permits of the authorised speed for that line being adhered to. East of Queen's Road the signals can be changed from red to yellow without the rear track circuit being occupied, as high speeds are not reached there. In addition a signal cannot be changed from red for a diverging route unless the correct aspect is showing in the junction indicator.

Instead of the position light junction indicators, route indicators, showing numbers or letters, of the multi-lamp type are installed at Waterloo, and in a few special places.

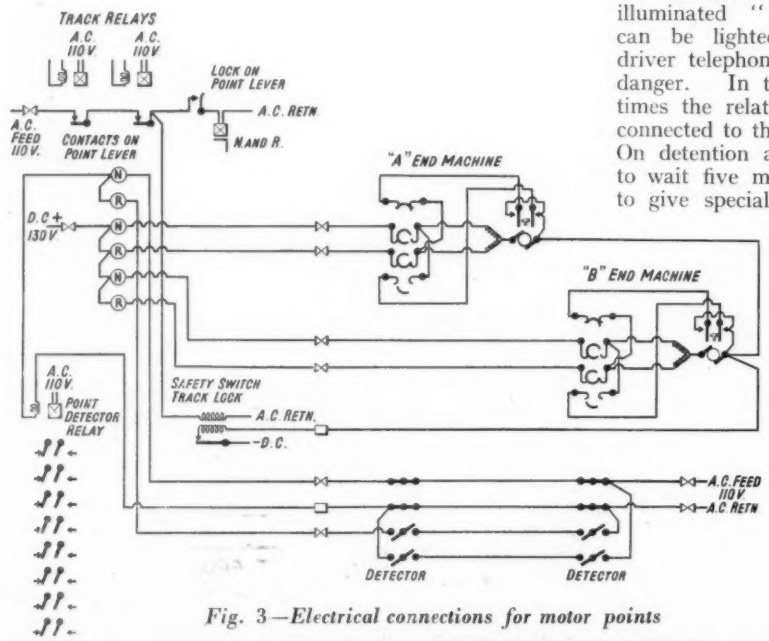


Fig. 3—Electrical connections for motor points

Telephones and Proceed Signs

At or close to the majority of the signals telephones are provided to enable drivers to obtain instructions from the signalmen when stopped by signal. At all the automatic or semi-automatic signals west of Clapham Junction illuminated "P" (proceed) signs are fixed, which can be lighted up by the signalman to whom the driver telephones, as an authority to pass the signal at danger. In the case of signal boxes closed at certain times the relative telephones and "P" signs are then connected to the next signal box in advance that is open. On detention at a danger signal the driver is required to wait five minutes, if no hand signalman is on duty to give special instructions, and then telephone to the signalman. If the train cannot be allowed to come forward the driver will be so advised, but if it can the signalman will switch on the "P" sign, where provided, or give such instructions as may be necessary. In either case the driver must then give one long whistle and proceed cautiously at a speed not exceeding 5 m.p.h. as far as the line is clear, or to the next signal, prepared to stop short of any obstruction. If the "P" sign is already lighted up when the driver arrives at the signal he need not telephone to the signalman, but must wait three minutes and then proceed as above, provided the sign is still illuminated.

This method of working has, we

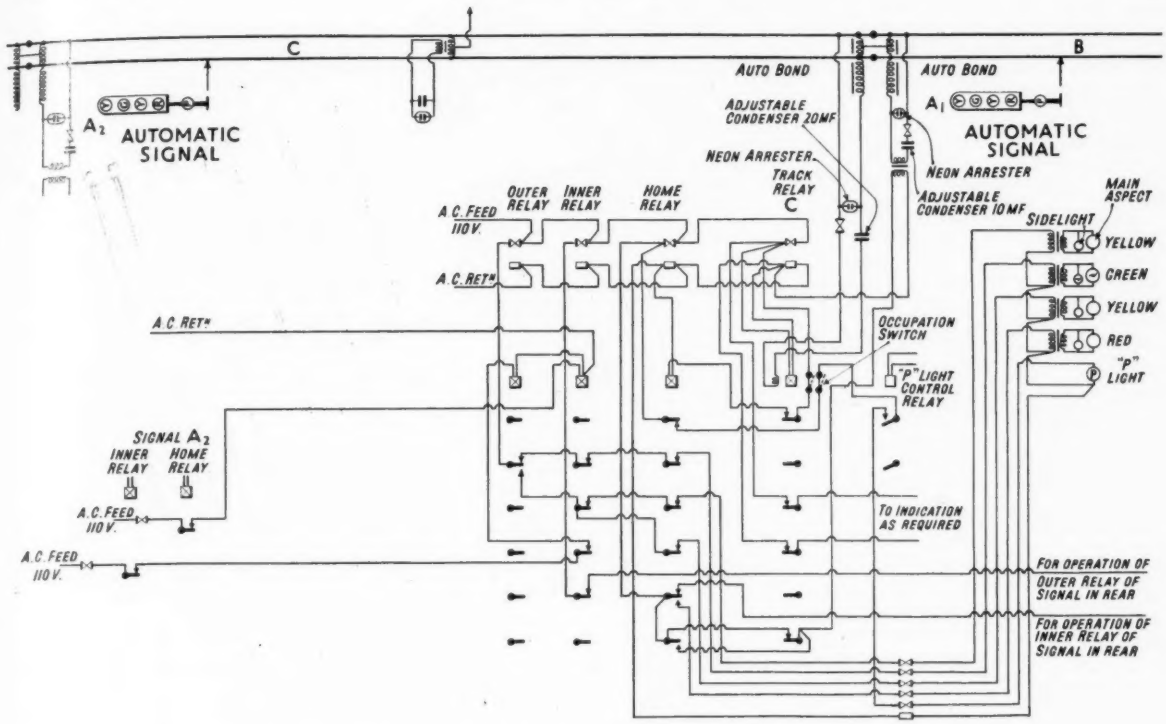


Fig. 4—Electrical connections for 4-aspect automatic signal with "P" sign

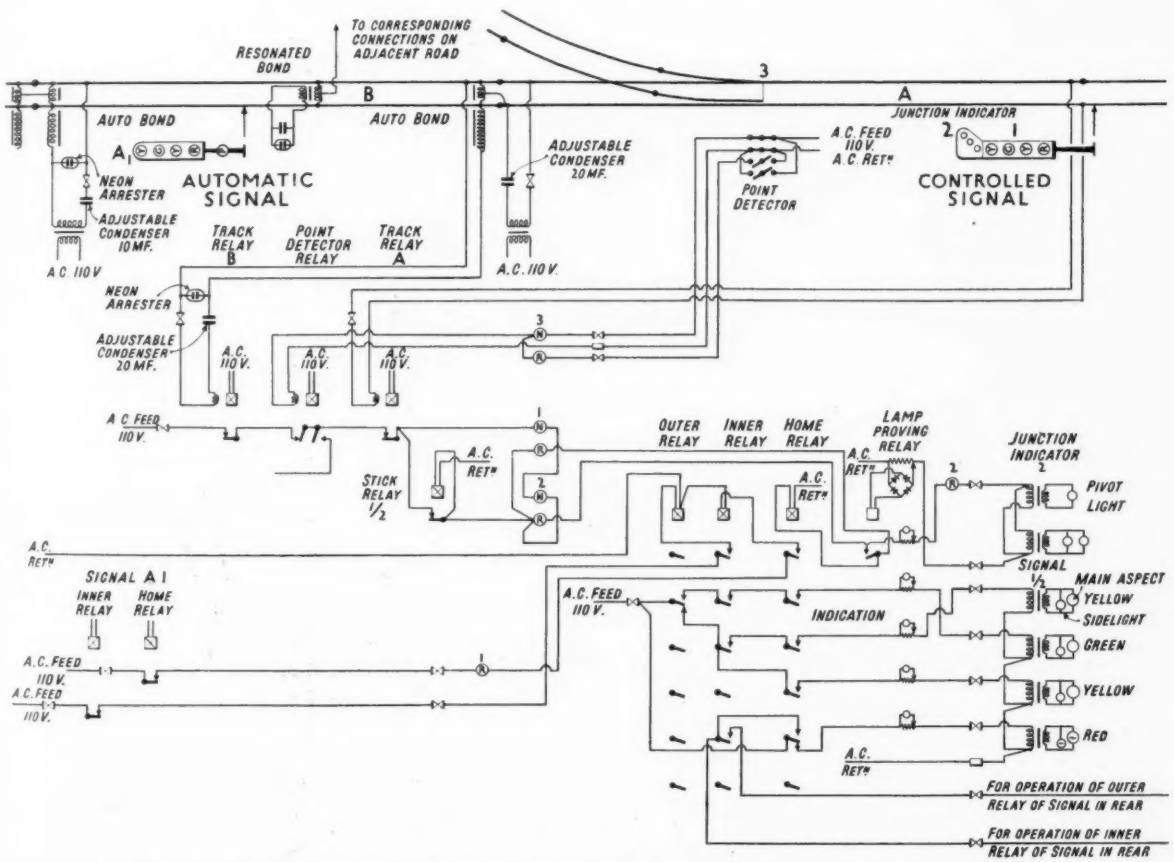


Fig. 5—Electrical connections for 4-aspect controlled signal and one-way junction indicator

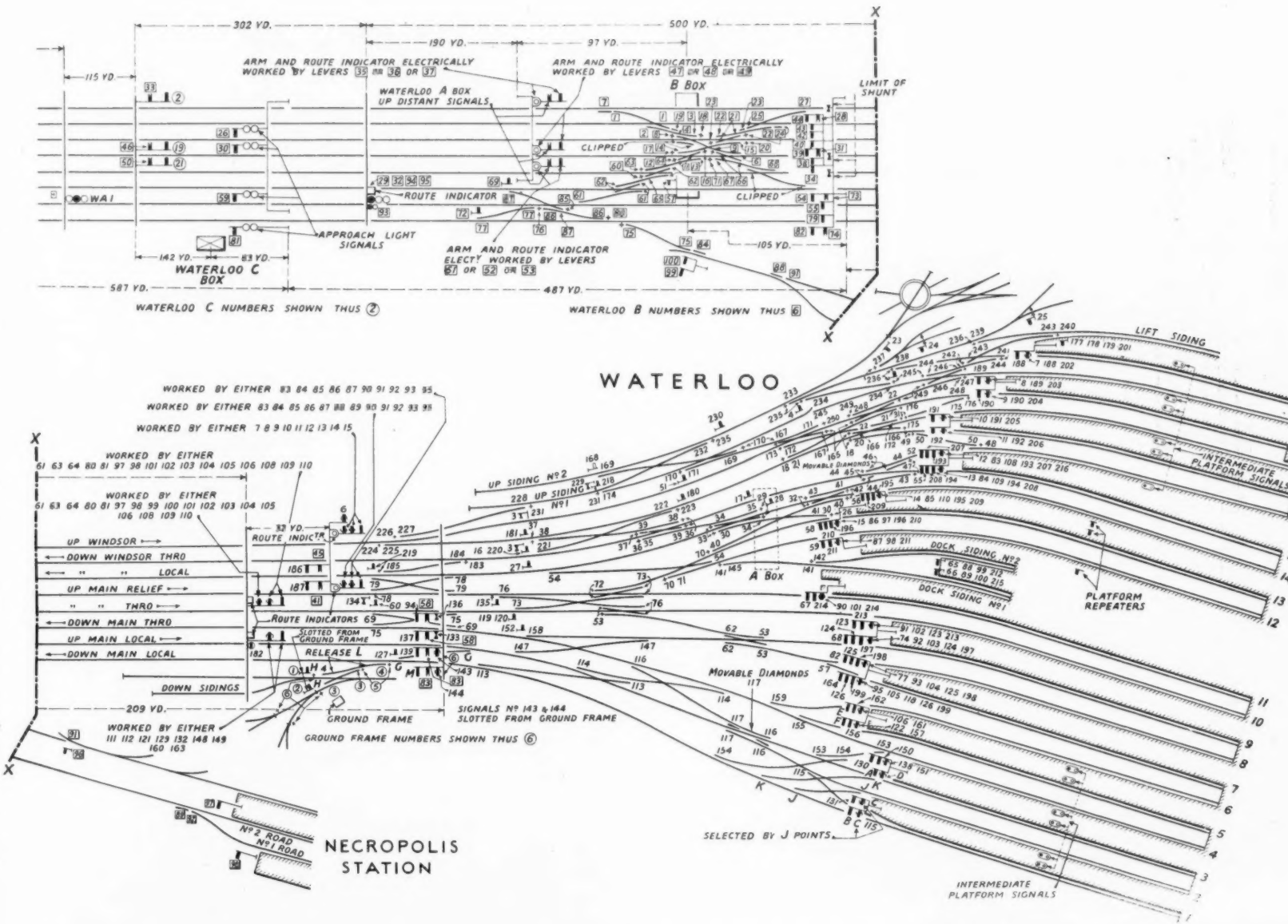

302 YD.
500 YD.
190 YD.
97 YD.
115 YD.
ARM AND ROUTE INDICATOR ELECTRICALLY WORKED BY LEVERS 35 OR 36 OR 37
ARM AND ROUTE INDICATOR ELECTRICALLY WORKED BY LEVERS 47 OR 48 OR 49
WATERLOO A BOX UP DISTANT SIGNALS
B BOX
LIMIT OF SHUNT
CLIPPED
ROUTE INDICATOR
APPROACH LIGHT SIGNALS
ARM AND ROUTE INDICATOR ELECTY WORKED BY LEVERS 51 OR 52 OR 53
105 YD.
142 YD.
83 YD.
WATERLOO C BOX
587 YD.
487 YD.
WATERLOO C NUMBERS SHOWN THUS (2)
WATERLOO B NUMBERS SHOWN THUS 6
WATERLOO
LIFT SIDING
INTERMEDIATE PLATFORM SIGNALS
PLATFORM REPEATERS
DOCK SIDING No 2
DOCK SIDING No 1
A BOX
MOVABLE DIAMONDS
SELECTED BY J POINTS
INTERMEDIATE PLATFORM SIGNALS
WORKED BY EITHER 83 84 85 86 87 90 91 92 93 95
WORKED BY EITHER 83 84 85 86 87 88 89 90 91 92 93 95
WORKED BY EITHER 7 8 9 10 11 12 13 14 15
WORKED BY EITHER 61 63 64 80 81 97 98 101 102 103 104 105 106 108 109 110
WORKED BY EITHER 61 63 64 80 81 97 98 99 100 101 102 103 104 105 106 108 109 110
32 YD.
ROUTE INDICATOR
UP WINDSOR
DOWN WINDSOR THRO
" " LOCAL
UP MAIN RELIEF
" " THRO
DOWN MAIN THRO
UP MAIN LOCAL
DOWN MAIN LOCAL
DOWN SIDINGS
209 YD.
ROUTE INDICATORS 69
SLOTTED FROM GROUND FRAME
RELEASE L
GROUND FRAME
SIGNALS No 143 & 144 SLOTTED FROM GROUND FRAME
GROUND FRAME NUMBERS SHOWN THUS 6
WORKED BY EITHER 111 112 121 129 132 148 149 160 163
UP SIDING No 2
UP SIDING No 1
NECROPOLIS STATION
No 2 ROAD
No 1 ROAD

Diagram of Waterloo Station and its immediate approaches showing the permanent way layout as now altered but retaining the old system of signalling which is due to be changed over in the autumn

Interior of Clapham Junction "A" box, showing new all-electric frame being installed in centre, and old electro-pneumatic frames (originally low pressure pneumatic) on each side, with special form of Sykes lock-and-block in use since 1911

Interior of West London Junction box, showing new all-electric frame being installed in background, and old frames and apparatus still working

which is due to be changed over in the autumn

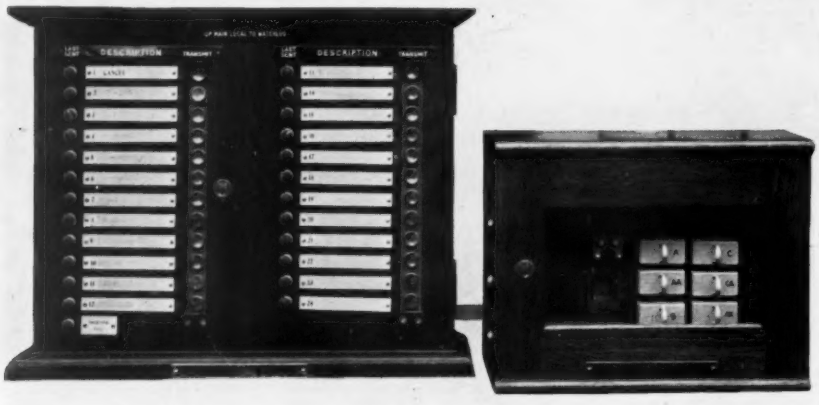


Fig. 6—Train description transmitter in cabin and apparatus for 24 codes

understand, been adopted as a result of the discussions that have for some time past been in progress between the railway companies, the Railway Clearing House, and the Ministry of Transport in order to put the passing of signals at danger, for whatever reason, on as satisfactory a basis as possible. It avoids the bunching of trains that has been known to occur at times on automatic signal sections, but does not relieve the driver of the responsibility of keeping a proper lookout and being prepared to stop short of any obstruction present. The telephones, which are hand-sets needing only to be lifted to call the signalman, are contained in small pedestal boxes, bearing black and white diagonally striped enamelled plates to indicate their purpose.

The class of signal at which he is waiting is indicated to the driver by white enamelled designation plates. All automatic signals bear the prefix WA and a reference number over a black horizontal stripe. Semi-automatic signals have the prefix letters of the signal box controlling them when open and their number, with the letters SEMI over the black bar. Controlled signals carry the signal box prefix letters and their number on a plain plate. All track sections are indicated. At Clapham Junction "A" and West London Junction the illuminated diagrams have white lining on a black ground, at the others the paper-fronted type is used. The lights are normally out, two red lamps lighting up when a track section is occupied.

Emergency Switches

At all automatic signals and certain semi-automatic ones switches have been provided, operated by special keys supplied to stationmasters for use in connection with wrong road movements and permanent way operations, enabling the signals concerned to be held at danger, irrespective of any other control, and the "P" signs dark. The use of these is governed by special instructions.

Train Describers

To advise the signalmen of the class and destination of trains, magazine describers of the same type as those between Coulsdon and Brighton have been adopted. They are already in use between Loco Junction box and Malden and will be extended as the rest of the new signalling is brought into use. To cover the complete installation a total of 32 transmitters and 65 receivers is required. Separate instruments are provided for each line, with capacities of 12 and 24 codes, as the case may be. One line wire connects each transmitter with its receiver, with a common return wire for a group of instruments.

Fig. 6 illustrates a 24 code transmitter and apparatus, and Fig. 7 a receiver and apparatus of similar size. Transmission is effected by depressing the key for the required message, as given on the label alongside, and immediately the corresponding code has been transmitted the adjoining lamp lights up and remains so until the next signal is sent. There is thus one lamp always illuminated to indicate "Last Train Sent." Another is provided to show when the receiver is full. The descriptions are stored as received, the first three being displayed on the instrument by the illumination of lamps opposite the corresponding engraved labels. The maximum storage capacity is 15 trains in this instance. As the first train indicated passes the receiving signal box, its description is cleared by pressing the clearance key, and the next three descriptions in the apparatus appear in the correct positions. In some cases receivers in succeeding cabins are coupled to operate from one transmitter to give early advice of approaching trains. Thus trains leaving Wimbledon "A" are described simultaneously to Wimbledon "B" and "C," Raynes Park and Malden.

Organisation of the Work

The final change-over, for which only a limited time was available, involved a great deal of work, and every effort was therefore made to get as much as possible done beforehand, leaving only what was strictly necessary to the last. The large amount of Sykes locking and numerous instruments in the cabins had to be kept working while the new electric locking and illuminated dia-

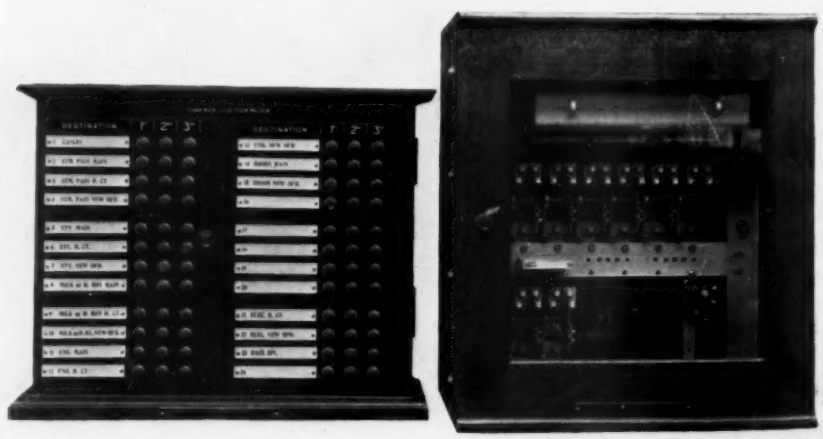
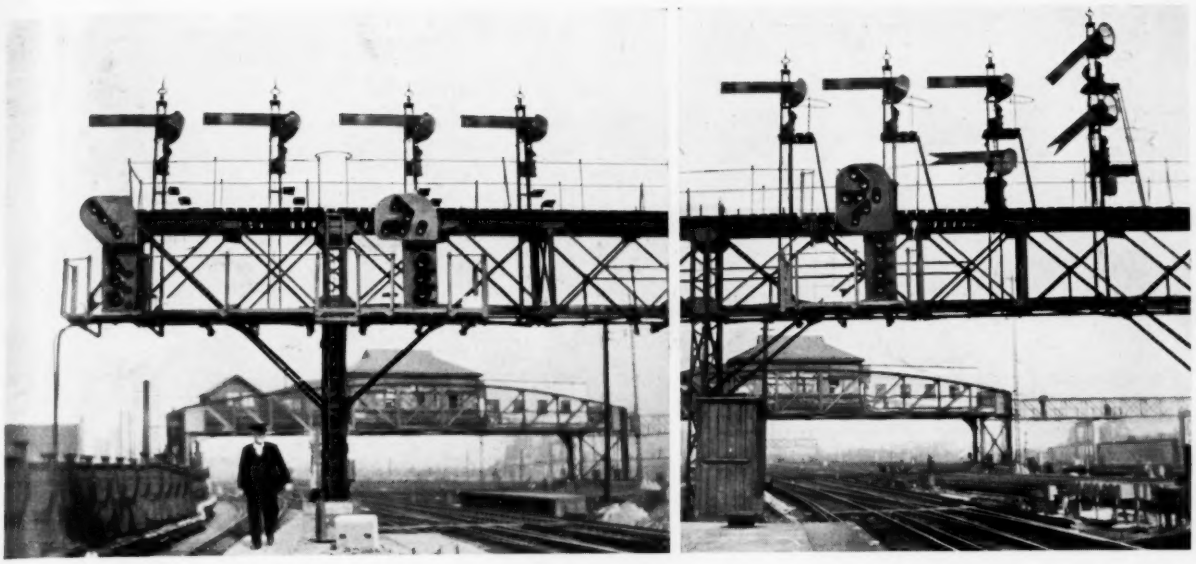


Fig. 7—Train description receiving indicator in and cabin apparatus for 24 codes



Views of new signals before removal of semaphores. Left: Up starting signals at Clapham Junction, Windsor lines, showing junction indicators for one and two diverging routes respectively. Right: Up Windsor through starting signal at Clapham Junction, with junction indicator for three diverging lines (to left) namely, up Windsor, Longhedge, and Kensington lines

grams, with relays and wiring, were installed and tested. Outside, the new signals had to be installed and the track-circuit work completed, as well as an extensive system of cabling and wiring, with alterations to ground work and the installation of a number of point machines. At Waterloo, especially in "A" and "B" boxes, a great deal of temporary work had to be done to cover the transition period till the new power box can be put into service. This, combined with the changes in the running roads, has involved extensive locking alterations under difficult conditions, the whole requiring the most careful organisation to ensure success. The new signalling was brought into use on May 17 without a hitch.

Signal Boxes

The following is a complete list of the signal boxes concerned, showing the changes made in each case:—

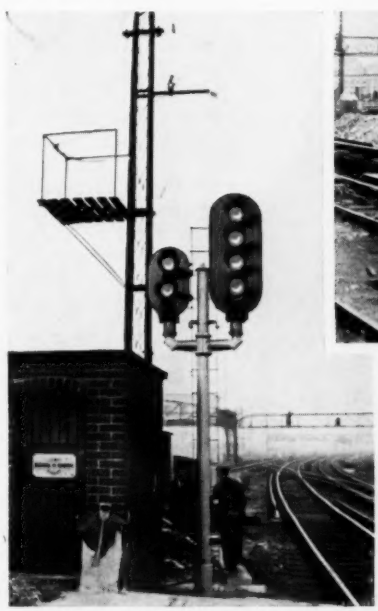
Waterloo "A"—To be abolished in final scheme and replaced by new all-electric box.
,, "B" and "C"—To be abolished in final scheme.
Vauxhall "D"—Already abolished.
,, East and West—To be abolished in final scheme.
Loco. Junction—Points operated mechanically.
Queen's Road East—Already abolished.
,, West—Most points operated mechanically, a few by power.
West London Junction—Old pneumatic type frames abolished and replaced by all-electric type, 59 levers. Electro-pneumatic operation of points retained; new facing point locks.
Clapham Junction "A"— Do. do. but 103 levers.
,, "D"—Already abolished.
Clapham Cutting—Already abolished.
Earlsfield (normally not manned)—Points operated mechanically.
Durnsford Road—Already abolished.
Wimbledon "A"—Most points operated mechanically, a few by power.
,, "B"—Points operated mechanically.
,, "C" (closed at intervals)—Points operated mechanically.
Raynes Park—Points operated mechanically.
Malden— Do. do.
Marsh Lane—To be abolished when Surbiton station reconstruction is finished.
Surbiton—New box. Most points operated mechanically; a few by power.
Hampton Court Junction—Points operated mechanically.

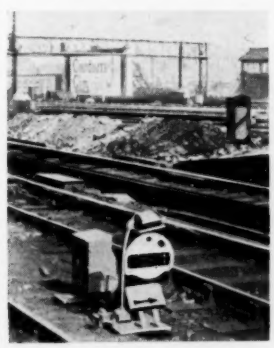
Supply of Material

The new signalling apparatus has been supplied by the Westinghouse Brake & Signal Co. Ltd. except the train describers which were provided by Siemens and General Electric Railway Signal Co. Ltd. Rolled section insulated rail joints and sheet metal test inspection cases were provided by W. R. Sykes Interlocking Signal Co. Ltd.; telephones at signals by the General Electric Co. Ltd. and the corresponding cabin instruments by Ericsson Telephones Limited. The cabling and wiring have been furnished by the following contractors:—

Johnson & Phillips Limited; Callender's Cable &Construction Co. Ltd.; Pirelli-General Cable Works Limited; Siemens Bros & Co. Ltd.; W. T. Glover & Co. Ltd.; W. T. Henley's Telegraph Works Co. Ltd.; Macintosh Cable Co. Ltd.

The scheme was designed and installed by the staff of the Southern Railway Company's Chief Engineer, Mr. George Ellson, to whom we are indebted for facilities to describe the work, and under whose supervision the work was carried out.



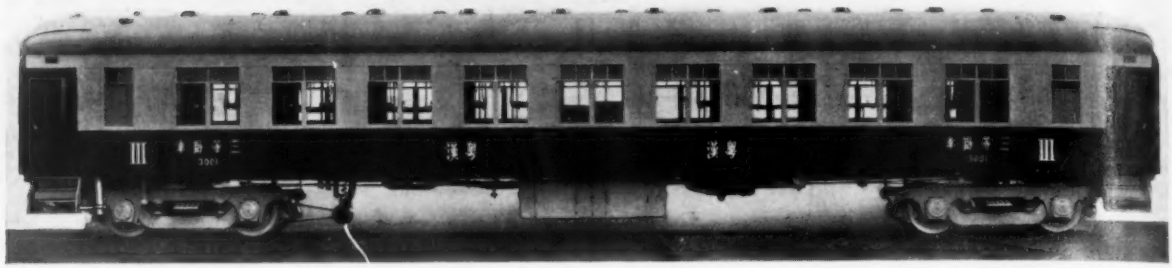


Typical Signals at Clapham Junction

Above: Ground signal showing floodlight attachment. Coloured lights used hitherto abolished. Left: Four-aspect running signal and two-aspect subsidiary signal for entering loop siding

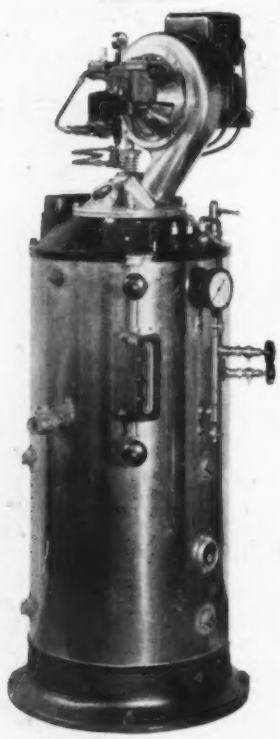
STEAM HEATING OF RAILWAY CARRIAGES

Details of Vapor system manufactured by Gresham & Craven Limited, Manchester



Third class sleeping car, Chinese National Railways, fitted with Vapor steam heating system

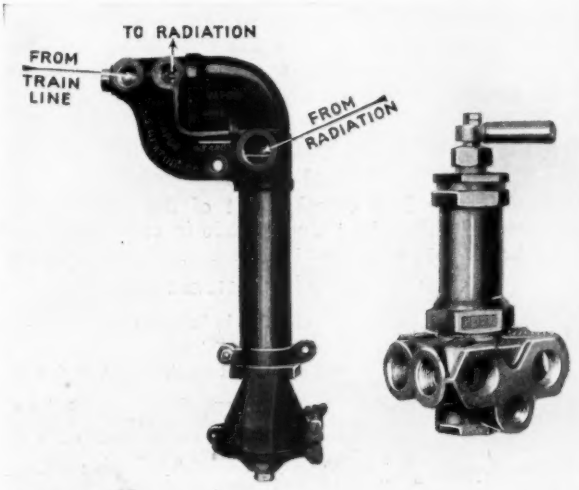
THE Vapor system of steam heating now manufactured in this country by Gresham & Craven Limited, Manchester, and also in use on the Continent, has many exclusive and advantageous features. Steam at pressures ranging between 50 lb. per sq. in. as a maximum and 10 lb. as a minimum, is supplied in the usual manner to a main steam pipe line suitably drained and arranged for standard vehicle intercoupling. From this point, however, the heat of the steam is controlled and distributed in a special way, the steam supply, reduced to atmospheric pressure being fed and controlled by easily accessible regulators outside the vehicle. The regulator receives the steam and by means of a thermostatically-controlled steam valve feeds it to the low pressure system which is fully open to the atmosphere at the extreme end so that only steam at atmospheric pressure is fed to the heating apparatus. The steam at this pressure is led into the vehicle and either passed through heating coils or short circuited back to the outlet side of the regulator. The short circuiting is effected by means of cut-out valves controlled either manually by train attendants or passengers according to the type of vehicle, or alternatively electrically controlled by thermostats in the cars themselves.



Boiler used for other than steam operated trains

It will thus be seen that absolutely even heating is assured, whilst no high-pressure steam is present in the coach at any point. The quantity of steam fed is controlled by the temperature of the exhaust steam which heats an expansive diaphragm in the outside regulator. There is no possibility of steam escaping inside the vehicles and no irregularity in the degree of heating as separate regulators for each compartment are not employed. All parts of the regulator and cut-out valves can be removed for examination or replacement without breaking any pipe joint, so that failures of a kind that would hold up the vehicle cannot occur. There are no high pressure packings and the regulation is such that only the exact demands for steam are supplied, thus ensuring the utmost economy.

The system, although more expensive in first cost, is nevertheless highly economical in use, the extent and character of any maintenance necessary being such as to reduce running costs, replacements and examination. The only part requiring periodical attention is the special brass expansive diaphragm in the regulator which can be changed outside the car in 30 seconds. There is the further advantage of distributing its heat within a very short time of turning it on and conversely of dissipating its local heat at the will of the operator. Provision is made for anti-freezing and drainage.



Vapor regulator *Vapor cut-out valve*

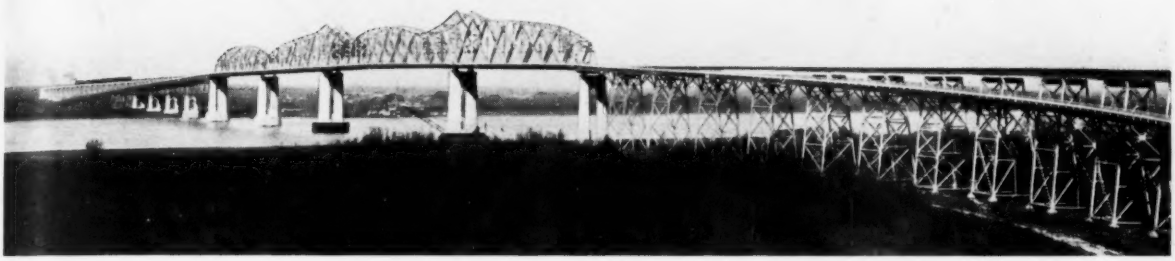
The system has also been developed for the heating of diesel railcars, trains of different types drawn by diesel locomotives and articulated units by the provision of suitable steam generating units. These must necessarily

be automatic, foolproof, compact, and light, and a series of boilers having steam generating capacities ranging from 200 lb. to 1,000 lb. an hour are available.

The boiler illustrated is a low-pressure one suitable for a power car with two trailers and has a capacity of 200 lb. of steam an hour, generated at 30-40 lb. per sq. in. It is oil-fired by a top draught arrangement using the same fuel oil as the diesel engine. It is extremely compact, requiring only 2 ft. by 2 ft. floor space and weighing about 650 lb. in working order. The blower and oil burner are automatically controlled by the steam demand and pressure, while the water level is maintained by electrically operated electrodes which control a maximum and minimum water level basis, to meet all possible contingencies. Such boilers can, of course, supply steam to any existing stock with heating equipment, as the car can be coupled up and steam supplied in the usual manner.

NEW RAIL AND ROAD BRIDGE AT NEW ORLEANS

A brief description of what is said to be the longest railway bridge in the world, spanning the Mississippi



THE City of New Orleans, Louisiana, has recently placed in service a bridge across the Mississippi for both railway and highway traffic which is claimed to be the longest railway bridge in the world. With approaches, the structure is 4·4 miles in length. The main bridge or river crossing is 3,525 ft. long and consists of a three-span through truss cantilever structure with a 790-ft. central span and two flanking spans of 530 ft. each, and a 530-ft. bowstring side span. From the east the four main spans are approached by four deck truss spans, three of 270-ft. and one of 333-ft. span. The land approaches consist of plate girders supported on steel trestles. The trusses of the through spans are 33 ft. apart centre to centre, and accommodate two railway tracks between, with an 18-ft. roadway and a 2 ft. 6 in. footpath on the outer side of each. The river spans provide 135 ft. clear headway above mean high water. The weight of steel in the river spans is about 20,000 tons and that in the approaches 40,000 tons.

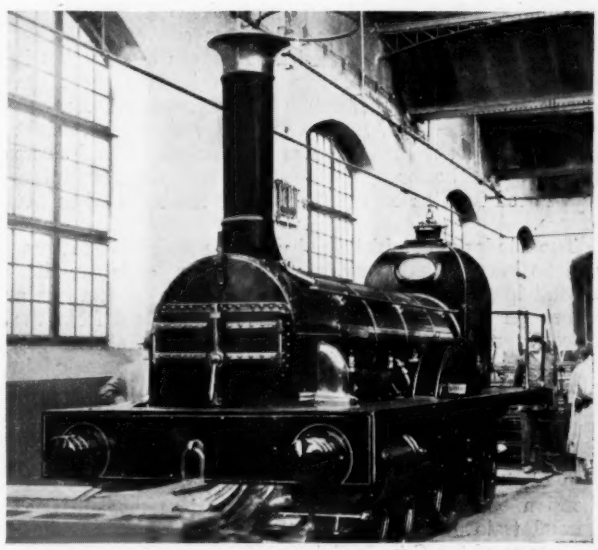
The long approaches were necessitated by the flat terrain, which is virtually at water level, and the requirement that the structure be carried high above the river in order not to impede navigation by the largest vessels, though, in point of fact, few pass this spot. By these approaches the railway line is given a maximum gradient of 1 in 80. The highway approaches are much shorter, having a maximum gradient of 1 in 25.

The subsoil underlying both the river and surrounding countryside is silt, sand and clay to unknown depths. The problem involved not only securing sufficient bearing for stable foundations, but, for the river piers, of guarding against scour as well. Prior to sinking the caissons, each pier site was protected from scour by woven willow mattresses, 250 ft. × 450 ft., on both upstream and downstream sides, which were weighted with rock and held in place by anchors.

Foundations for the four main piers are on caissons sunk to a depth of 170 ft. below mean water level. The pier at the extremity of the western flanking span is on a caisson taken down to 115 ft., and the first eastern approach pier similarly to 80 ft.: the other eastern approach span piers are founded on pile clusters.

The bridge cost approximately £2,600,000. The railway which uses it is the Southern Pacific, paying a rental to the municipality for the privilege. The bridge replaces a train ferry and has reduced by 30 minutes the time necessary to effect the crossing of the river, as well as eliminating the heavy ferry working expenses.

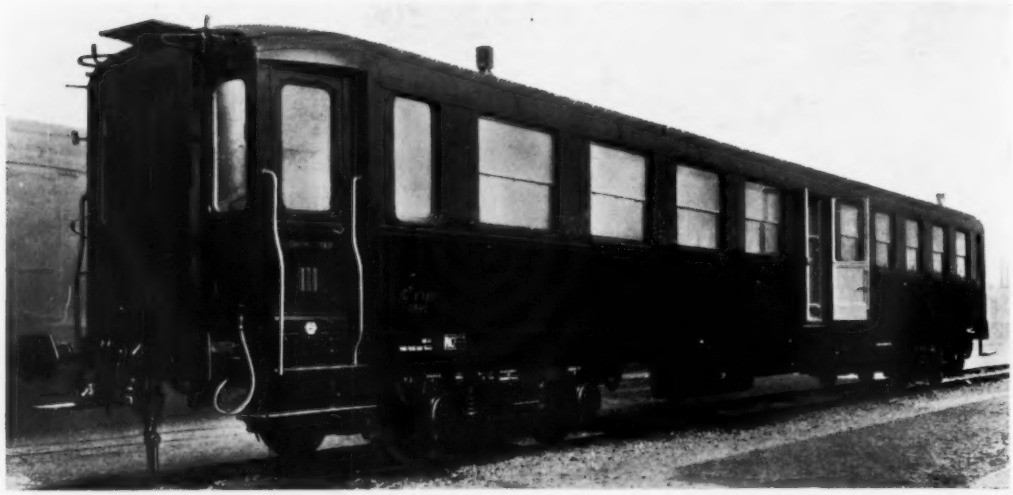
A Veteran French Locomotive



"Pierrot," a P.L.M. veteran of 1856, now preserved in the company's works at Lyons

P.O.-MIDI AMBULANCE OR COUCHETTE COACHES

Four coaches designed primarily for pilgrimage traffic are readily convertible into well-appointed third class couchettes



WE illustrate one of the four P.O.-Midi ambulance coaches for pilgrim traffic, of which we gave a brief description, with diagram, in our issue of March 27 (page 611). As will be seen from the lettering on the end doors, these are dual-purpose vehicles, designed to be used as third class *couchettes* outside the pilgrimage season, which extends from April to September. The upholstery, which in view of the special purpose of the vehicles is more luxurious than normally provided in *couchettes*, is covered with mattresses when in pilgrimage service. The carriages are decorated in a pleasing colour scheme of French grey and white.

Through the open doors in the exterior view, one of the partitions dividing the central entrance vestibule from the passenger accommodation is visible. Each partition has an opening 2 ft. wide giving access to the central gangway, and this is widened to 3 ft. 3 in. at a convenient height for the passage of stretchers. The chance of draughts is thus obviated, for, as shown in the interior view, the berths themselves are situated in well protected alcoves. Thick velvet curtains, lined with rubber for added weight to stop them swaying, give extra privacy. The ladders to the upper berths are telelescopic, and are dismantled and stored in clips on the floor under the berth when not in use.

The windows, of which the height is a noticeable feature, can be lowered half way, and the upper berth can then be slid inwards for 18 in. on the runners shown, while a screen on the window side protects the patient from the direct ingress of air. The six compartments at one end of the car, shown in our plan of March 27, accommodate attendants, and patients who are able to sit up. The latter may also use the lower berths, which are long and wide enough for two passengers lying or seated.

One of these coaches was hired by Thomas Cook & Son Limited for the National Pilgrimage to Lourdes from London on May 19, when it was worked through in a special train from Boulogne to Lourdes, avoiding Paris by means of the Grande Ceinture from Stains-Pienefitte to Juvisy. Two have been reserved by the same firm for the forthcoming pilgrimage of the Roman Catholic Diocese of Liverpool. When used as *couchettes*, the centre doors can be locked and the end entrances used as in ordinary practice.

One of the two-berth alcoves, showing access ladders in use and dismantled

RAILWAY NEWS SECTION

PERSONAL

The Minister of Transport has appointed Mr. John Pike to act as a member of the Railway Rates Tribunal, during Mr. Quirey's absence due to illness, as recorded in our issue of May 22.

South African Railway Staff Changes

Mr. W. A. Moyers, Chief Civil Engineer, has been granted long leave and has proceeded overseas.

Mr. W. E. Turnbull, System Manager, Durban, has been granted six months' leave.

Mr. E. H. Wilson, System Engineer, Durban, has been appointed Inspecting Engineer, Johannesburg.

Mr. A. W. Hitchens has been appointed permanently as Mechanical Engineer, Pietermaritzburg.

G.W.R. Appointments

The following appointments have been approved by the directors of the Great Western Railway:—

Mr. G. F. Boxall, Assistant Stores Superintendent, Swindon, to be Stores Superintendent, Swindon, upon the retirement of Mr. A. C. Cookson on June 30.

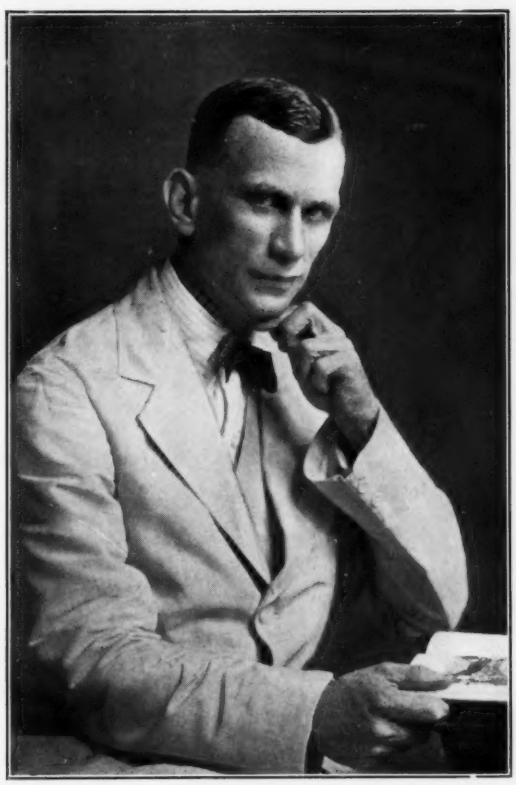
Mr. G. H. C. Wiltshire, Chief Clerk, Cashier's office, Paddington, to be Chief Cashier, Paddington, upon the retirement of Mr. J. Tyrrell on June 30.

Mr. A. W. Parker, Chief Clerk, Hotels Department, to be Indoor Assistant, Hotels Department.

Mr. R. A. P. Setterfield's appointment as, and Mr. G. J. Walker's retirement from Manager, Hotels, Refreshment Rooms, and Restaurant Car Department, announced in The Railway Gazette of January 10, will take effect on June 30.

We regret to record the recent death of Mr. T. L. Chubb, sometime Chief Mechnical Engineer, Buenos Ayres Western Railway. Son of Mr. T. A. Chubb of the former South Eastern Railway, he was trained as a pupil of Mr. Cudworth's on that line and went out to Argentina in 1883, becoming Locomotive Superintendent of the Buenos Ayres Western Railway in 1890, and Chief Mechanical Engineer in 1907. He retired in 1909.

Mr. P. H. Maflin, O.B.E., M.C., who, as anticipated in our issue of May 1, has retired from the position of Agent, H.E.H. the Nizam's State Railway, received his technical training at the Royal Indian Engineering College, Coopers Hill, and was appointed as an Assistant Engineer in the Railway Branch of the Indian Public Works Department on January 1, 1907, being posted to the North Western Railway. In 1912 he was appointed to officiate as Executive Engineer in charge of the construction of the Jumna Bridge, Saharanpur, and was permanently promoted to that rank in 1915. From April, 1916, to March, 1920, he was on active service in East Africa and on the North West Frontier, holding a commission in the Royal Engineers. He was mentioned in despatches three times and received two decorations, one of them being the M.C. From 1920 to 1923 he was employed on the North Western Railway first as Superintendent of the Kalabagh-Bannu Railway and later in the Agent's office. In 1923 Mr. Maflin was appointed Deputy Director of Projects in the office of the Railway Board, and a year later was promoted to be Secretary, Railway Board. After being placed on special duty in 1927-8 in connection with the proposed broad-gauge railway between Agra and Karachi, he again became Secretary to the Railway Board, a post he held until April, 1929. He was then appointed Agent of the Eastern Bengal Railway and in September, 1930, officiated as a Member of the Railway Board. It was in March, 1931, that he was appointed Agent of the Nizam's State Railway, the position from which he has now retired. His tenure of office at Hyderabad has been marked by the bringing up to date of the system generally, but its most remarkable feature has been the formation of a most comprehensive railway-owned road transport system, a venture which has been crowned with great success. He was awarded the O.B.E. in August, 1920.



Mr. P. H. Maflin, O.B.E., M.C.,
Agent H.E.H. the Nizam's State Railway, 1931–36

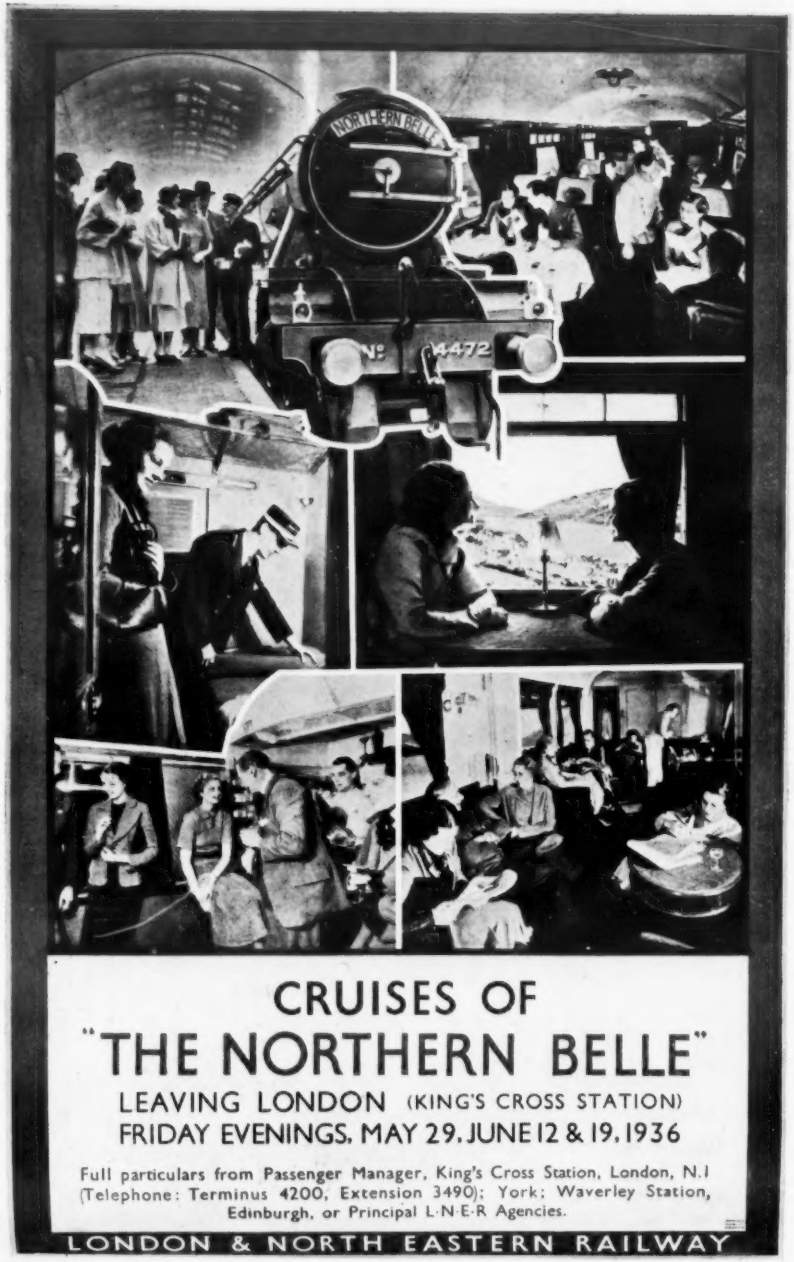
Indian Railway Staff Changes

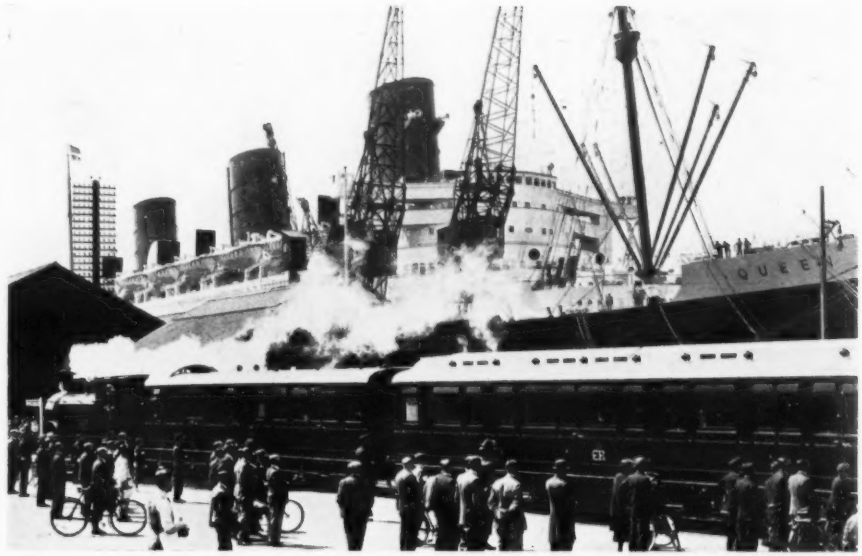
Mr. J. Mackinnon, Deputy Agent, N.W.R., has been appointed Senior Government Inspector of Railways, Bombay. Mr. A. M. Sims has succeeded him as officiating Deputy Agent.

Khan Bahadur Mazaffar Hussain, officiating Deputy Chief Engineer, N.W.R., has been appointed to officiate as Divisional Superintendent, Multan. He is succeeded as Deputy Chief Engineer by Sirdar Bahadur Ram Singh.

Mr. M. W. Middleton, Managing Director of the British Wagon Co. Ltd., whose death we announced in our issue of June 28 last, left personal estate in Great Britain valued at £17,849.

Mr. Oliver Veltom, an annuitant of the Great Western Railway, whose death on May 22 we regret to record, was 88 years of age on April 19 last. He joined the service of the Great Western Railway at Paddington in February, 1868, and three years later was transferred to Bristol. He subsequently had experience at Bath station and returned to Bristol in April, 1874, where he remained until December, 1882, when he was appointed Chief Down Parcels Clerk at Paddington. Mr. Veltom was appointed Clerk in


NORTHERN BELLE
No 4472
CRUISES OF
"THE NORTHERN BELLE"
LEAVING LONDON (KING'S CROSS STATION)
FRIDAY EVENINGS, MAY 29, JUNE 12 & 19, 1936
Full particulars from Passenger Manager, King's Cross Station, London, N.1
(Telephone: Terminus 4200, Extension 3490); York; Waverley Station,
Edinburgh, or Principal L.N.E.R Agencies.
LONDON & NORTH EASTERN RAILWAY



The royal train which brought H.M. the Queen and other members of the Royal Family to Southampton on Monday, drawing alongside the "Queen Mary." The vessel sailed on her maiden voyage on Wednesday

Above: Interior of new enquiry office at King's Cross, L.N.E.R.
Left: The attractive poster announcing this season's series of "Northern Belle" cruises. The first leaves King's Cross, L.N.E.R., tonight (Friday)

Charge of the Parcels Department at Paddington in 1896, which position he held until he retired from the service in 1909.

We are sorry to learn of the illness of Sir Hugh Arthur Rose, D.S.O., LL.D., a Director of the L.M.S.R., Member of the Northern Counties Committee, L.M.S.R., and County Donegal Joint Committee.

Mr. J. G. Duncan, M.Inst.C.E., Chief Assistant to the Chief Engineer, Buenos Ayres Great Southern and Buenos Ayres Western Railways, retired on pension at the end of April after nearly 37 years' service, having joined the B.A.G.S.R. in September, 1899, as a construction engineer.

LOCOMOTIVE ENGINEERS' AND FIREMEN'S UNION

Mr. John Bromley, General Secretary of the Associated Society of Locomotive Engineers and Firemen, is retiring on June 16.

Mr. W. J. R. Squance, the Assistant General Secretary, has been appointed to succeed Mr. Bromley, who has been presented by the society with an honorarium of £854.

Mr. William Gourlay, General Manager for Great Britain of the American Express Company, who, as announced in last week's issue, is retiring on June 1, was yesterday entertained to luncheon at the Langham Hotel by his traffic friends in England. Mr. E. Huskisson (Thos. Cook & Sons) presided and proposed the toast of "Our Guest." Speeches in support were made by Mr. Ashton Davies (L.M.S.R.), Mr. S. J. Jackson (United States Lines), Mr. C. F. Wolley Dod (Imperial Airways), and Commander R. St. John (Daimler Hire). Mr. Gourlay feelingly replied and expressed his great appreciation of the representative character of the gathering and the presentation of old prints of Scottish scenes.

We regret to record the death, on May 24, at the age of 77, of Mr. Ernest Albert Scanes, last Solicitor to the former London, Brighton & South Coast Railway. Mr. Scanes, who was educated at the City of London School, was articled to Sir Philip Rose, Bt., of the firm of Norton, Rose & Co., who were acting as Solicitors to the Brighton Company. He was admitted to the Law Society in 1889, and joined Sir Philip's staff at London Bridge, being made Chief Assistant to Sir Philip Frederick Rose when the latter was appointed Solicitor to the L.B.S.C.R., in 1908. On Sir Philip's retirement, Mr. Scanes became Assistant Solicitor; and, on the death from war wounds of Mr. Philip Vivian Rose, in 1917, he was appointed Solicitor, the position he held until his retirement at the time of the railway amalgamation in 1923.

Institution of Locomotive Engineers in Germany

A party of members of the Institution of Locomotive Engineers numbering over 100 left Liverpool Street station last Friday evening for a visit to Germany. Special coaches and a restaurant car were provided by the L.N.E.R. on the 8.33 p.m. relief train to Parkeston Quay, where the ss. *Amsterdam* was boarded. On arrival at the Hook of Holland the party entrained in four special coaches, to which a breakfast car was attached. At Arnhem the coaches were attached to a through express entering German territory at Cleves where Dr. Wagner, of the Locomotive Department of the German State Railway, accompanied by his chief assistant, Herr Dipl. Ing. Röhrs, joined the party. The German State Railway had made arrangements to run the special coaches through without change to Ehrenbreitstein, on the right bank of the Rhine opposite Coblenz. Here the train made a special stop and the party was conveyed in motor launches provided by the Reichsbahn to the opposite bank of the Rhine, where Herr Max Gercke, formerly of the M.A.N., who had been co-opted on the committee for the tour, joined the party. On leaving Coblenz by the express Rhine steamer Vaterland for Mainz at 2.25 p.m., lunch was served. A very enjoyable trip of seven hours up the Rhine ensued, and the members also partook of dinner on board. The party put up for the night at Mainz and on Sunday morning at 9.35 a.m. left in special carriages with a Mitropa dining car of the latest type (built this year by Wumag) for Munich via Frankfort. Members were much interested in the change-over from steam to electric traction at Treuchtlingen, where the train consisted of 16 heavy vehicles and was taken on by two electric locomotives.

The morning of Monday was spent in a visit to the Reichsbahn repair shops at Munich, where repairs to both steam and electric locomotives were being carried out. The works, which are situated just outside the city, are relatively new and very extensive and the crane system especially impressed the visitors. Overhead runways and high speed light and heavy cranes work in every direction. A wide pit separates the steam from the electric section and in this all material is collected. A fast running traverser serves the pit and repair bays on each side. During meal times music is broadcast over the works from Berlin and one of these breaks occurring at 9.15 the visitors heard the strains of "Aida" and the melodious voice of Tauber impressively reproduced throughout the great buildings. All the Reichsbahn workshops are equipped for broadcasting.

The party left Munich for Augsburg at 2.20 p.m. on a special train hauled by the M.A.N.-engined 1,400 h.p. diesel hydraulic locomotive, of the design described and illustrated in our *Diesel Railway Traction Supplement* dated January 24, 1936. This locomotive has Voith transmission and Büchi supercharger. The journey of 38 miles to Augsburg was accomplished at an average speed of over 60 m.p.h. On arrival at Augsburg the party was conveyed to the M.A.N. works, where in a large room decorated with German and British flags, an address of welcome was delivered in English by Herr Becker, Managing Director of the M.A.N., in which he reminded his hearers that they were now at the birthplace of the diesel engine, and briefly outlined the history and activities of the M.A.N. concern. Mr. A. W. Agnew, late Chief Mechanical Engineer of the London Passenger Transport Board, in reply, expressed the thanks of the institution for the welcome the party had received. The members were then shown over the diesel engine and printing machine works, after which they were entertained to tea by the company, when Mr. Agnew again expressed thanks, which were acknowledged by Herr Gercke on behalf of the M.A.N. The party was next conveyed to the town hall where, in the magnificent Golden Chamber, the Lord Mayor of Augsburg in a felicitous speech welcomed the visitors to the city. Herr Dr. Hellmann, President of the Reichsbahndirektion, Augsburg, also spoke. Both speeches, which were delivered in German and translated into English by Herr Gercke, laid stress on the desirability of cordial Anglo-German relations and the good that such visits as that of the Institution of Locomotive Engineers do towards that end. After a tour of the city, terminating in a dinner at the Hotel Drei Mohren, the party returned to Munich in the same diesel-hauled special train.

Tuesday was spent in a visit to the Bavarian Alps. From Munich to Garmisch-Partenkirchen the party travelled in one of the new electric observation cars. Thence to Grainau a special steam train was provided, and, beyond, the ascent was continued by rack railway to Schneefernhaus. After lunch here the party ascended the Zugspitze, the highest peak in Germany, 9,727 ft., by the funicular railway.

On Wednesday the party left Munich for Nuremberg where a visit was paid to the M.A.N. works. The programme for Thursday comprised a tour of Franconia concluding with the institution dinner and a reception at Nuremberg. Today the members are travelling to Berlin where, in the evening, they are being entertained at a banquet by the German State Railway. On Saturday a special trip is to be made by high-speed train to Hamburg, and the return journey to England begins on Sunday. The party is due back at Liverpool Street on Monday morning.

Left: The attractive poster announcing this season's series of Northern Belle cruises. The first leaves King's Cross, L.N.E.R., tonight (Friday)

LONDON & NORTH EASTERN RAILWAY

The Proposed Severn Bridge in Relation to the Depression in South Wales*

By Sir JAMES MILNE, K.C.V.O., C.S.I.,
General Manager, Great Western Railway

The decision of the Select Committee of the House of Commons to reject the Bill for a road bridge across the River Severn without calling upon the opponents to state their case, cannot have come as any surprise to those who had followed the evidence given in support of the project. There was no evidence of any real demand for the bridge, and although a number of local authorities expressed themselves in favour of the scheme, their opinions were based on hypothetical considerations and had no regard to actualities. They assumed that a considerable shortening of the road route between South Wales and the West Country would lead to the establishment of new industries and the development of tourist resorts in South Wales, and would therefore be of great benefit to that area. That this is a fallacy could readily have been demonstrated if any real endeavour had been made to ascertain the facts before the Bill was promoted in Parliament. Unfortunately, the three major industries in Monmouthshire and South Wales—coal, iron, and steel—and rail transport, were never invited by the Ministry of Transport, the Commissioner for the Depressed Areas, or the promoters, to express their views on the proposal. If they had been, they could have furnished valuable information which would have controverted most of the arguments urged before the Parliamentary Committee in favour of the scheme. It may have been thought by the promoters that as it was obviously undesirable in the public interest for the traffic of the heavy industries to be diverted from rail to road, those industries were not very greatly concerned, but it does not seem to have been appreciated that a proposal which must be detrimental to the railway company would necessarily have an adverse effect on the basic industries, and therefore on Monmouthshire and South Wales as a whole.

The difficulty of establishing new industries in Monmouthshire and South Wales is not due to any lack of transport facilities. A strong deputation which included representatives of all the principal industrial, commercial, trading, agricultural, property-owners', and other rate-paying interests in Monmouthshire and South Wales, waited upon the Minister of Health in February last, and informed him that "despite the efforts made during recent years to attract new industries with the hope of relieving the acute industrial depression in the district, these efforts have been a failure, as industrial undertakings have preferred districts throughout the country where rates are low and conditions more favourable, and for this reason the continuance of heavy rate expenditure is impeding the recovery of trade and industry; is preventing the settlement of new industries; is increasing the distress in the area; and is imposing an intolerable burden upon all sections of the community." As an indication of the hardships inflicted upon wage earners in South Wales, it is only necessary to point out that the increase in rates during the past twelve months has, in certain districts, resulted in an increase of rent for working class dwellings, varying from fourpence to a shilling per week."

The bridge scheme would, admittedly, have entailed an increase in the rates in Monmouthshire and in the other contributing areas in South Wales.

Tourist Traffic Problematical

With regard to tourist traffic, the proposed bridge would undoubtedly have attracted many visitors to see the structure, but it would not have attracted holiday traffic. Motorists passing through a district are of little value to tourist resorts. It is necessary to induce visitors to spend their holidays at the resorts before any real advantage accrues, and the major portion of the present holiday traffic is drawn from London and the industrial areas. Neither the bridge, nor the fact that it would shorten the distance to some, but not all, of the South Wales resorts would influence people from London to spend their holidays in South Wales, and the only industrial area from which the bridge would afford better road access to South Wales is Bristol, which already enjoys a large choice of readily accessible resorts in the South and West of England, whose competitive position by road and rail would not be in any way affected by the construction of the bridge.

The Great Western Railway Company has made a number of special efforts to attract holiday makers to South Wales, but in the public mind it is regarded in the main more as an industrial centre than a popular holiday resort. There is a lack of local enterprise in providing the amenities necessary to attract visitors from outside the area, *i.e.*, good hotel and boarding house accommodation, facilities for recreation and amusement; and it is also a handicap that the licensing laws are more stringent in Monmouthshire and South Wales than elsewhere. The company has endeavoured to induce the tourist resorts to advertise more extensively by offering to contribute, on a liberal basis, to approved schemes of advertising, but the response has been very disappointing.

It has long been recognised that the interests of the Great Western Railway and of Monmouthshire and South Wales generally, are very closely allied. If Monmouthshire and South Wales prosper, the railway benefits. If the railway company becomes more prosperous, there is no part of the company's system which benefits to a greater extent than Monmouthshire and South Wales, as the major portion of the company's supplies of coal, iron, and steel are obtained from that area, at a cost which last year amounted to over £2,250,000.

Local Rates

The company is also one of the largest employers of labour in Monmouthshire and South Wales with a staff of over 27,000, and a wage bill of approximately £4,500,000 per annum. It is also a very large ratepayer; its payments, including the amount paid into the Rates Relief Funds, amounted to £684,000 last year, out of a total payment of £1,340,000 for the whole system, the large proportion paid in Monmouthshire and South Wales being due to the high poundage in that area. In addition to its annual expenditure, the company has spent many millions in Monmouthshire and South Wales under the Development (Loan Guarantees and Grants) Act, 1929, and a further expenditure of about £500,000 is contemplated on schemes to be undertaken under the recent arrangement with the Government for a guaranteed loan.

If the proposed Severn Bridge had been constructed there is every probability that the company's net revenue would have been seriously depleted. Under the Severn Tunnel Railway Act of 1872, the company, in view of the heavy cost involved in constructing the tunnel and the shortening of the then existing route, was authorised to base its charges for all traffic passing through the tunnel on a distance of twelve miles instead of the actual distance of 4¼ miles. The benefit of this provision could not have been maintained as the company would have been forced to reduce its charges to meet road competition, and in addition would have lost a large volume of traffic to its road competitors.

Recent legislation has been directed towards placing road and rail competition on a more equitable footing, but it is generally recognised that the railways are still seriously handicapped by restrictions which do not apply to their road competitors. Any reduction in railway rates for traffic between important centres is likely to have far-reaching effects upon the rates for similar traffic in other parts of the country, whereas reductions in road rates have no repercussions on similar charges elsewhere, road hauliers being entirely free to select the traffics which they carry and to fix the rates they charge. The ultimate effect of any large increase of this unequal competition must be to break down the main principles on which railway charges are based, and to bring about an in-

* Reprinted by arrangement from the June issue of the *Great Western Railway Magazine*.

crease in the rail charges for the traffic of the basic industries which must be conveyed mainly by rail.

Depression in South Wales

The depression in Monmouthshire and South Wales is due entirely to the decline in the business of the coal, iron, and steel, and rail transport industries, and the only solution to the South Wales unemployment problem lies in the direction of finding some means of bringing about a revival of these industries. Radical changes may be necessary to achieve this, and the position is sufficiently serious to justify drastic action. The promotion of the Severn Bridge Bill has only tended to divert public attention from this major problem.

In the iron and steel industry, Monmouthshire and South Wales are not securing their full share of the country's total production of steel. Last year, only 19·11 per cent. of the country's output of steel was produced in this area, compared with 24·38 per cent. in 1929, and 27·51 per cent. in 1924. If the 1929 percentage had been maintained, an additional 518,477 tons would have been produced in the area last year and, taking 25 cwt. of coal as being required for the production of one ton of steel, an additional 648,000 tons of coal would have been used, and 2,500 more miners employed.

The decline in coal production in Monmouthshire and South Wales is due almost entirely to the falling off in coal exports. This export trade has been, and still is, of immense value to the nation, and it is unjust that the colliery companies who have built up this business and lost it through causes beyond their own control, should be called upon to bear the whole burden of the loss. They certainly have a strong claim to participate in a larger share of the developing inland trade than they are at present obtaining. The figures published weekly in the Board of Trade Journal show that the production of coal in Great Britain last year was 15,680,000 tons in excess of 1933, but the increase in Monmouthshire and South Wales was only 550,000 tons. It is not in the national interest that such a state of affairs should continue and it is certainly capable of adjustment. If we examine the position more closely, we find that in 1923 19·6 per cent. of the output of coal in Great Britain was produced in Monmouthshire and South Wales. In 1929 this percentage had fallen to 18·7, and last year it was only 16·1 per cent. Had the percentage been maintained at even the 1929 level, an additional 5,866,000 tons would have been produced in Monmouthshire and South Wales, thus giving employment to about 24,000 more miners, and additional employment on the railways and in other directions. As against this, the temporary employment of a relatively small number of unemployed miners on work in connection with the construction of the bridge is not a material factor and an equivalent expenditure on other proposals in that area would be of greater benefit.

The above figures indicate that there is every justification for giving special consideration to the coal exporting districts in meeting the requirements of the home market, and, unless some assistance is given in this direction, there will be little prospect of regaining the export trade when the international position becomes more stable. There is every reason to anticipate an ultimate revival of the export coal trade from South Wales, as the coal is generally regarded as being of exceptional quality. Moreover, as the total quantity produced in Monmouthshire and South Wales is only 3 to 5 per cent. of the world's output of coal, it should not be impossible to find a market, through the medium of trade agreements, for all the coal which South Wales can produce.

Great Western Railway Earnings

The depression in the coal and steel industries has seriously affected the earnings of the Great Western Railway Company. The docks in South Wales, on which over £21,000,000 have been expended, are no longer remunerative, and the gross receipts of the whole of the Great Western Company's undertaking have fallen from £36,184,000 in 1929, to £29,788,000 last year. This decrease in revenue has been offset to some extent by reduced expenditure which has accentuated the depressed conditions in Monmouthshire and South Wales. The number of the company's employees in that area has been reduced by over 5,000 since 1929, and this represents a loss in spending power of about £750,000 per annum. The average quantity of locomotive coal bought annually during the past three years was 300,000 tons less than the average for the three years 1927-29, equivalent to the output of 1,200 miners. The company's purchases of iron and steel have also been considerably less owing to reduction in rolling stock, etc.

There are obviously many difficulties to be overcome before any marked improvement in the general condition of Monmouthshire and South Wales can be expected, but they are not insurmountable, and there is no doubt that if the major industries could be restored to prosperity, the establishment of new industries would rapidly follow, and increased employment assist the development of tourist resorts.

Notwithstanding the parlous conditions which now prevail in Monmouthshire and South Wales it is felt that much of the distress could be alleviated if the factors which have been the real cause of it, and the measures which are most likely to effect a remedy, were presented in their proper perspective to those entrusted with the responsibility of restoring the areas to their former prosperity. It is hoped that the information in this article may be of some assistance in this respect.

Indian State Railways Dinner

The Indian State Railways Annual Dinner was held at the Café Monico on May 25, with Sir Alan Parsons, K.C.I.E., I.C.S., in the chair. Others present were:—

Sir Clement Hindley, K.C.I.E., Sir Seymour Tritton, K.B.E., Lt.-Col. Sir Gordon Hearn, Kt., C.I.E., D.S.O., Lt.-Col. E. Barnardiston, D.S.O., Major J. W. Gordon, O.B.E., Sir Hugh Hannay, Messrs. A. S. Jameson (President), D. S. Burn, C.I.E., W. J. Tomes, Rama Rau, C.I.E., J. Fairfield, C.I.E., E. J. Buckton, B. R. Singh, E. L. Manley, F. S. Bond, H. D. Creedy, W. R. R. More Benett, V. T. Janson, W. G. Hornett, G. J. Cassie, S. T. Gresham, A. C. Turner, H. B. Holmes, C.B.E. (Hon. Sec.), W. C. Stanton, V. H. Boalth, C.B.E., D. Cardew, H. Sparrow, H. H. Saunders, O.B.E., N. D. Calder, A. R. Gundry, A. E. Williams, A. Lewis, C. H. J. Bolton, E. Ingoldby, G. Harvey Kelly, V. P. Bhandarkar, J. Humphreys, G. Trimming, A. J. Boyd, J. Spencer, P. D. Low, W. H. J. Pyne, J. E. Jack, H. Johnson, H. G. Johnson, and J. A. Morris.

The Chairman said that he was indebted to Mr. Holmes—who for so many years had made such efficient arrangements for the dinner—for three sound hints. These were that he, as Chairman, should (1) keep off statistics, (2) be brief, as the purpose of the gathering was not to listen, and (3) say something to make fellows laugh: he would endeavour to act upon them.

He was glad of the opportunity both to say what a great honour it was to be Financial Commissioner of Railways, and also to express his thanks to Indian railwaymen for their great kindness to him. "Truthfully," he said, "I enjoyed my time with Indian railways more than any other part of my service in India. In work I had great respect for the commonsense and practical levelheadedness of the men with whom I had to deal. But when work was done also, I never had a better time, as there was always someone to share my amusements, and I found thoroughly good companions throughout all the railways in India."

Continuing, Sir Alan turned to the present financial position of Indian railways: they were not doing as well as they ought, and there were always those who thought they could put matters right in a moment. He himself was no believer in such hasty short cuts, but was glad to be able to state that during the last two months there had been definite signs that matters were changing for the better. He was sure that steady efficiency and refusal to be flustered would see them through.

Mr. A. S. Jameson, President, then proposed a vote of thanks to Mr. Holmes for his continued and successful activities as Honorary Secretary: this was responded to with musical honours. After expressing his thanks, Mr. Holmes said he felt that the time had come when he was getting out of touch with the present-day and younger men, and when someone living in London and in closer touch with past and present Indian railwaymen should take over the secretaryship. (No one, however, appeared willing to volunteer!

The Institute of Transport Congress at Birmingham

(*See editorial article on page* 1024)

The Institute of Transport Congress at Birmingham which was held from May 20 to 23 was attended by upwards of 400 members and visitors. This is the second time the institute has forgathered at Birmingham, a previous congress having been held there in 1927 under the presidency of the late Mr. R. H. Selbie.

The congress was opened by the President of the Institute, Sir Cyril Hurcomb (Permanent Secretary to the Ministry of Transport), on the Wednesday afternoon and was accorded a civic welcome by the Lord Mayor of Birmingham (Alderman S. J. Grey). There followed a discussion of the paper, referred to in a leading article in our issue of May 22, by Mr. A. C. Baker, the General Manager of the Birmingham Corporation Transport undertaking, on "Municipal Passenger Transport." This paper and those announced for the subsequent sessions were taken as read and the maximum time was thus available for discussion. This admirable procedure caused some embarrassment to Mr. H. W. Payne (Principal Assistant to Chief Goods Manager, G.W.R.) who, at Thursday's session, presented a paper on "The Function of the Trader in an Efficient System of Transport" (reported in THE RAILWAY GAZETTE last week). Mr. Payne, owing to some misunderstanding, had prepared his paper for reading aloud and he complained in good humour that much of the effect must be lost. This paper Mr. Frederick Smith referred to as a "gigantic leg pull," but Mr. Payne assured his audience that it was not and made a vigorous reply to his critics which brought him an ovation at its conclusion. The third paper, submitted on the Friday, was by Mr. E. S. Herbert on "Second Thoughts on the Road Traffic Acts."

On the first evening the delegates experienced the lavish hospitality of the City of Birmingham at the Council House where the Lord and Lady Mayoress held a reception in their honour. Dancing followed the reception until the early hours, and the magnificent Birmingham Art Gallery which is connected with the Council House was open to the visitors. Other entertainment was provided in the Council Chamber by artists including a conjurer whose unceasing dry humour delighted his audience.

On the following (Thursday) afternoon, after the discussion of Mr. Payne's paper, there were alternative visits of inspection. The largest party, numbering about 150, proceeded to the locomotive works of the L.M.S.R. at Crewe, being conveyed there and back by a special train provided by the L.M.S.R. The visitors were the guests of the company at lunch during the outward journey and at tea during the return journey. Accompanying them were Messrs. Ashton Davies (Chief Commercial Manager), S. H. Fisher (Assistant Chief Operating Manager), J. F. Brook (District Passenger Manager) and R. A. Riddles (Principal Assistant to Chief Mechanical Engineer). The special train was driven in to the works where the party was met by Mr. W. A. Stanier, the Chief Mechanical Engineer, and Mr. F. A. Lemon, the Works Superintendent, and divided into small groups for the tour of inspection. After passing through the boiler shop and smith's shop, the visitors proceeded to the erecting shop, machine shop and fitting and machine shop, passing *en route* the steel foundry, forge, mounting shop, stores, &c. A vote of thanks proposed by Mr. W. H. Watson was replied to by Mr. Ashton Davies.

Another party visited the Grand Union Canal and, in motor barges comfortably arranged with chairs, passed from Knowle through the new system of locks to Solihull where the visitors were entertained at tea at the George Hotel. Before returning to Birmingham, the President in a brief but happily-phrased speech expressed the thanks of the guests and this, Mr. W. H. Curtis, the Chairman of the company, acknowledged. Mr. Curtis was supported by Messrs. C. K. Tatham, L. Bygrave and G. Hatcher, the Deputy-Chairman, Manager and Assistant Manager of the company respectively. A third party visited the works of Morris Commercial Cars Limited.

Thursday evening was the President's evening. With Lady Hurcomb, he received the delegates at the Botanical Gardens at Edgbaston in a setting of rich foliage and to the sounds of a gracefully-playing fountain, as well as of the protests of parrots whose evening rest was disturbed, and cheerful music. Dancing followed in the ballroom. Tony's Band kept the evening enlivened to the end when it vied with the guests to acclaim the President with "For he's a jolly good fellow."

There were three further visits of inspection on the Friday afternoon—to the goods stations of the G.W.R. at Wolverhampton, to the works of the Birmingham Corporation Tramway and Omnibus Department at Tyburn Road, and to the works of the General Electric Co. Ltd. at Witton.

The journey to Wolverhampton was made in a 69-seater streamlined diesel railcar of the G.W.R. which was worked into the Herbert Street goods station. After a tour of the sheds, yards and warehouses, the visitors were conveyed in buses provided by the Wolverhampton Corporation Transport Department, to the Walsall Street station where they were conducted over the sheds and yards including the Shrubbery Basin where boated traffic is dealt with. An interesting feature was the inspection of that part of the Walsall Street depot which formed the original passenger terminus of the Oxford, Worcester and Wolverhampton Railway (West Midland). The diesel railcar carried the visitors back to Snow Hill station where tea was provided. Mr. F. K. Pelley, the District Goods Manager of the G.W.R. at Birmingham, who accompanied the party with Mr. W. E. Hart, the Divisional Superintendent, acknowledged the vote of thanks proposed by Mr. L. W. Gupwell.

The Friday evening was taken up with the dinner of the Birmingham and District Section of the Institute of Transport, held at the Queen's Hotel. Mr. W. H. Watson, the Chairman of the Section, presided, and proposed the toast of "The City of Birmingham," to which the Lord Mayor replied; and the President of the Institute responded to "The Institute of Transport," which was given by Councillor Norman Tiptaft. Other speakers were Mr. O. C. Power, who proposed "Our Guests," Mr. T. H. Rose, who acknowledged the toast, and Mr. J. McDonnell, who proposed the health of the chairman.

The congress closed on Saturday, May 23, with an excursion to Lilleshall, formerly the home of the Dukes of Sutherland. Here the delegates were able to recuperate from their exertions in restful grounds of great beauty and to find diversion in various pursuits, including archery. There was even transport interest in the form of "The Lilleshall and Woodland Railway," a miniature railway running from the mansion to the ruins of the eleventh century abbey, the motive power being a petrol engine disguised as a steam locomotive. The deception has been resented occasionally, and passengers have, it appears, been known to refuse to travel on discovering it! The formal conclusion of business had taken place after Mr. Herbert's paper, when on the motion of the President votes of thanks were passed to all those who had helped in organising the congress or who had kindly provided the various special facilities and visits. A vote of thanks to the President himself was carried on the motion of Mr. Sidney E. Garcke.

A large number of ladies participated in the congress and took a lively interest in all the proceedings. Special morning visits for them were arranged to the laundry and dairy of the Birmingham Co-operative Society and to the works of Cadbury Bros. Ltd.

Those who participated in the Congress included:—

Messrs. G. M. Alford, A. W. Arthurton, A. C. Baker, R. W. G. Barnett, L. C. F. Bellamy, C. F. Birney, F. G. Bristow, J. F. Brook, G. Cadbury, A. R. Cooper, Ashton Davies, R. H. Dobson, S. F. Fisher, Sidney E. Garcke, E. H. Garfield, W. H. Gaunt, C. le M. Gosselin, D. M. Gracie, W. E. Hart, E. B. Hassall, E. S. Herbert, H. Howells, R. J. Howley, A. J. Insall, J. A. Kay, A. E. Kirkus, D. R. Lamb, J. G. Merriweather, J. S. Nicholl, W. Nicholls, J. Paterson, H. W. Payne, A. J. Pearson, F. K. Pelley, O. C. Power, W. H. Prendergast, W. H. J. Pyne, A. S. Redman, J. B. Scattergood, W. B. Shelton, L. G. Wyndham Shire, Frederick Smith, W. J. Smith, J. H. Stirk, H. C. Wallace, J. W. Watkins, W. H. Watson, W. A. Willox, and A. Winter Gray.

Discussions on Institute of Transport Papers

In the course of the Congress held at Birmingham last week by the Institute of Transport three papers were read, one on Wednesday, May 20, and another on Thursday, May 21, both of which we dealt with briefly in last week's issue. The third was read after THE RAILWAY GAZETTE was published and is therefore abstracted in the present issue. Every paper was followed by a discussion, and we now subjoin some brief notes on certain interesting points which then arose.

Municipal Passenger Transport

Following the presentation of Mr. A. C. Baker's paper (referred to editorially on page 988 of last week's issue) Mr. O. Cecil Power, of the Birmingham & Midland Motor Omnibus Co. Ltd., dealt with three points, namely, peak loads, congestion, and transport boards. Mr. Baker had observed that the peak load had been accentuated by the development of housing estates, and in some towns 70 per cent. of the rolling stock lay idle between the hours of 9.30 a.m. and 4.30 p.m. It would be of great benefit to transport undertakings and to the travelling public if the times of starting in factories were staggered, but there appeared to be little likelihood of manufacturers assenting. Considerable relief could also be afforded by schools opening at 9.15 or 9.30 a.m. Mr. Power urged that further efforts should be made to induce the large employers of labour as well as the schools to stagger the time of opening and closing in order that the peak could be flattened. With regard to congestion, preference should be given to public service vehicles, on the ground of convenience to the greater number. In his opinion a transport board would be undesirable in Birmingham; his company worked wonderfully well with the Birmingham and surrounding corporations, and, as far as he knew, the public was well satisfied with the service given.

Mr. C. Owen Silvers, Manager and Engineer, Wolverhampton Corporation Transport, referred to the difficulties of providing transport in connection with housing schemes, and advocated building blocks of flats in central positions instead of creating new self-contained townships on the outskirts. Mr. Silvers said that his experience with the diesel-engined bus was comparatively recent, but was satisfactory; he was convinced that the diesel had many points in its favour.

Mr. A. R. Cooper, Chief Engineer, London Passenger Transport Board, maintained that tubes were the only real solution to congestion on the roads. He gave the figure of £750,000 a route mile as the inclusive cost of a system of tube railways.

Mr. D. Halliwell expressed the opinion that £750,000 a mile did not represent the true cost of a tube railway, although the figure might be correct for London. He thought it would be more in the neighbourhood of £500,000 for provincial cities. The question must be considered not only from the immediate economic standpoint but as providing relief for the future.

Dr. K. G. Fenelon said that, as the tendency was for greater co-ordination among local undertakings, care should be taken to see to industrial relationships in large operating undertakings so that sudden strikes should be avoided. Conciliation machinery should therefore be available to overcome difficulties and remove discontent.

The Function of the Trader in an Efficient System of Transport

Mr. H. W. Payne's paper, abstracted on page 997 of last week's issue of THE RAILWAY GAZETTE, was followed by a discussion in which Mr. W. H. Gaunt criticised the paper on the grounds that it failed to explain what was expected of the trader in an efficient transport system. Referring to savings in transport costs, he said that he thought most large traders took advantages of such savings to widen the field of distribution of their products.

Mr. C. E. Jordan said that he would like to see the railways deprived of their powers to own and operate ancillary businesses, and as a *quid pro quo* he would abolish the private ownership of wagons. Referring to the circuitous routes for traffic passing over more than one system, Mr. Jordan thought that some revision of the agreements made with traders under the Railways Act of 1921 was desirable to eliminate waste.

Mr. D. R. Lamb thought it was a little unfair to indict the trader for causing transport confusion without stating definitely how the trader could be of assistance.

Mr. A. Hastie suggested that there should be some central organisation in London, to which application could be made for rate quotations for all the railway companies.

Mr. Ashton Davies foresaw the day when it would be found that transport would have to be regarded as a single co-ordinated concern, and he therefore deprecated the suggestion to strip the railways of any of their rights to operate ancillary concerns. On the question of charges, Mr. Ashton Davies considered that the traders and the railways were dependent upon each other. There were charges in which the price of the commodity had to be considered.

Mr. E. W. Willis, deploring the misuse of the words "rationalisation" and "co-ordination," regretted also Mr. Payne's use of "function" in the phrase "division of function."

Mr. James Paterson regarded transport as the partner and not the servant of the trader. The trader was in the position of the man who paid the piper. He was not only entitled to call the tune, but might also ascertain what tunes the piper could play. Moreover, he had to pay for the time spent in rehearsing unusual tunes.

Mr. Frederick Smith submitted that the problem of branch lines had never really been effectively tackled. Large-scale experiments should be made in the closing of branch lines and their substitution by railway-co-ordinated road services.

Mr. L. W. Gupwell, drawing attention to the fact that the railway method of charging had been developed over a hundred years and was of necessity a complicated and patchwork arrangement, suggested the establishment of a more logical system.

Mr. S. J. A. Brett asked if, as had been suggested, the road was to carry all the heavy traffic and leave only the bulky goods to the railway, the trader would be satisfied to pay the high rates necessary to compensate the railways for the loss of the heavy traffic.

Messrs. D. Halliwell, A. G. Marsden, and A. J. Pearson also spoke.

Sir Cyril Hurcomb (President), in thanking Mr. Payne, remarked upon the fact that, with Ministry of Transport statistics available, the trader was now able to know far more about the industry than in pre-war days. Referring to co-operation between the trader and the railways, Sir Cyril drew attention to the various endeavours that had been successfully made in this direction. It seemed to him that the traders had shown great readiness to assist in solving problems that had arisen.

Mr. Payne, in reply, said that his paper was an argument in favour of an acknowledgment that the railways were entitled to make their revenue as laid down by Parliament, and which they were not getting. It had been said that the trader should be a partner. He agreed, but he did not wish for a partner who always said "What can you give me? I have nothing to give you." In conclusion, he added, if anybody suffered from the delusion that the railways were not commercially-minded, he would be happy to see him at Paddington and show him they were.

Second Thoughts on the Road Traffic Acts

In the discussion which followed the reading of Mr. E. S. Herbert's paper (abstracted on page 1032), Mr. O. Cecil Power suggested that the useful function of panel commissioners had had its day. As the chairmen of the traffic commissioners had been made the sole licensing authority for goods vehicles, he did not think any operators would now object to their being made the sole adjudicators for passenger service vehicles. The question of the peak hour also required reconsideration.

Mr. Ashton Davies thought the Road Traffic Act had really brought order out of chaos, and had established for the road passenger transport industry an arrangement enabling it to get

security of tenure and to know exactly in what direction it had to look for competition. No additional competition could be placed against it in its own industry without the authority of the traffic commissioners. He submitted that the beneficial effect of the security given by the Act to the small operator applied equally to road passenger transport in general, and that a very big advance in the development of that industry had been secured. Regarding Mr. Herbert's statement that the road industry had a grievance in that it was denied under the licensing system the ability to operate as many coaches as it desired, he would point out that the restriction applied only to a limited number of services, and those of long distance, competing with backbone railway services. From the stage carriage services there was an income of over £53,000,000, which the railway companies never appeared in court to oppose. Their opposition concerned a very limited number of services embracing a revenue of something like £2,500,000.

Mr. W. A. Willox said there had been a plethora of traffic facilities, and the Road Traffic Acts had succeeded in cutting down supply to demand. He suggested that consideration should be given to the possibility of stimulating increased demand, and uttered a warning that such a demand, arising suddenly out of the precipitation of international strife, might find the transport industry unprepared.

Mr. E. W. Willis declared himself a great sympathiser with the little man, who, it seemed to him, was soon to be co-ordinated out of existence. That was a tragedy, because it must always be remembered that the big man of today had been the little man of yesterday, and if the little man could no longer come into the transport industry, in the years to come it would be found to be shrinking.

Major F. J. Chapple remarked that in all the proceedings under the Act when there were opposing operators, or when the railway and road interests were opposing each other, the passenger himself was generally the last person referred to; he was looked upon as a sort of necessary evil—the person who found the money, and all the argument centred in the point as to whether A or B should have his body; whereas the whole point ought to be, which was the best way of carrying him.

Mr. Sidney E. Garcke thought that the enormous development of the private motor car was going to be a physical and engineering question rather than a control question. The main road system was being improved to such an extent as to increase the big problem of the future, namely the handling of traffic in the cities. Unless something was done to make physical changes inside the built-up areas there would be a chaos which would be a national scandal.

Railway Staff and Labour Matters

(*By our labour correspondent*)

After a week's debate, the annual assembly of delegates of the Associated Society of Locomotive Engineers and Firemen reached an important decision on Saturday last, May 23, concerning the proposals which had been put forward with a view to a settlement of the claim of the trade unions for the discontinuance of the percentage deductions from earnings. The assembly passed the following resolution: "That the executive committee be instructed to prosecute our claims through the machinery of negotiation; and, on the decision of the Railway Staff National Tribunal being made known, the same to be submitted to the branches and this annual assembly of delegates assembled to decide acceptance or rejection."

The Railway Clerks' Association's Annual Conference opened at Torquay on Monday, May 25. Mr. F. B. Simpson, M.P., in his presidential address to the conference stated that, whereas in 1919 the membership of the association was 8,043 and the funds amounted to £1,283, at the present time the membership numbers 60,630 with funds approaching £400,000.

Commenting on the wages position, Mr. Simpson said that the executive committee of the Railway Clerks' Association decided to accept the proposed settlement, subject to negotiations being opened next year with a view to complete restoration of standard conditions. "Having regard to all the circumstances at that time," said Mr. Simpson, "I make no apology for such decision and the Railway Clerks' Association's attitude during the discussions."

He went on to explain that it was intended that the conference should debate the general question "and in relation to subsequent happenings." This presumably has reference to the differing decisions reached by the delegate conferences of the National Union of Railwaymen and the Associated Society of Locomotive Engineers and Firemen, and further developments may be anticipated when the executive committees of the three railway trade unions have jointly considered the position. Mr. Simpson, after comments in regard to superannuation questions, spoke on the financial position of the railways. "It is held," he said, "that the workers should make sacrifices to secure a larger distribution to shareholders. No one disputes the existence of hardships in some instances where no interest return on capital is secured, but the over-all earnings of more than 3 per cent. is convincing testimony that railways are not down and out, and the grievance of no return to some people is against the existing financial structure and division rather than against the wage-earner or, indeed, the railway user."

During the next few weeks two colourful personalities who have figured prominently for many years in railway staff and labour matters are due to retire from active service as leaders of their respective trade unions, to which they have rendered loyal and earnest service. These are Mr. John Bromley, the General Secretary of the Associated Society of Locomotive Engineers and Firemen, and Mr. A. G. Walkden, J.P., M.P., the General Secretary of the Railway Clerks' Association. Their successors have already been chosen. Mr. W. J. R. Squance, who is at present Assistant General Secretary of the Associated Society of Locomotive Engineers and Firemen, will succeed Mr. Bromley on June 16 and, at the Railway Clerks' Association's Conference on Monday last, Mr. W. Stott, who has been Assistant Secretary of the association for twenty-five years, was elected to occupy Mr. Walkden's position.

THE INSTITUTE OF WELDING.—The 13th annual general meeting of the Institute of Welding was held on Wednesday at the Institution of Mechanical Engineers. Sir Alexander Gibb, the President, delivered an address in which he outlined the notable developments in welding during the past year, mentioning particularly the use of arc welding in rolling stock construction on British railways, including the carriage underframes of the Silver Jubilee train of the L.N.E.R., those of the new sleeping cars of the L.M.S.R., and the special wagons of the L.P.T.B. for transporting 60-ft. rails and other permanent way material. He mentioned also the recent use of oxy-acetylene welding for building up worn crossings.

Forthcoming Meetings

June 9 (*Tue.*)—**Antofagasta (Chili) and Bolivia Railway Co. Ltd.** (Ordinary General), Winchester House, Old Broad Street, E.C.2, at 12 noon.

June 12 (*Fri.*)—**British Electric Traction Co. Ltd.** (Ordinary General), Winchester House, Old Broad Street, E.C.2, at 11.30 a.m.

Forthcoming Events

May 31–June 6.—Industrial Transport Association, at Central Hotel, Glasgow. Annual Conference.

June 8–12.—Institution of Mechanical Engineers, at York. Summer Meeting.

June 8–13.—International Congress of Acetylene, Oxy-Acetylene Welding and Allied Industries, at Caxton Hall, Caxton Street, London, S.W.1.

June 10 (*Wed.*).—Institution of Civil Engineers. Conversazione.

June 11 (*Thurs.*).—Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.2, 7.30 p.m. "Life in a Booking Office," by Mr. E. Codd.

Ancillary Businesses of the British Railways

V—Canals

It is not always realised how great an interest the British railways have in the canal system of the country. Approximately one-third of the canals and navigable rivers of Great Britain are in railway ownership or under railway control, including several waterways of considerable importance to the economic life of the nation. The canals are unique among the ancillary businesses of the railways in that they are representative of an industry which, in the pre-railway era, was the principal medium for the inland distribution of minerals and merchandise. Railway competition made great inroads into canal traffic, which, despite drastic tariff reductions, soon fell to alarmingly low levels. Physical difficulties and lack of co-operation amongst the numerous canal companies rendered it impossible to compete against the new form of transport. Unsuccessful attempts to prevent the passing of railway legislation were followed by offers to withdraw opposition provided the railways bought up the competing waterways. It was in these circumstances that the railways became the reluctant owners of nearly 1,000 miles of canals, particulars of which, together with capital expenditure, are shown below:—

Company	Number	Length	Capital expenditure
		Miles	£
G.W.R. ...	9	210	753,561
L.N.E.R. ...	11*	246	1,308,858
L.M.S.R. ...	12	536	6,010,227
Southern ...	1	4½	77,700
Joint	1	½	—
Total ...	34	997	£8,150,346

* Including the Fossdyke Navigation and Witham Navigation leased to the L.N.E.R. at a rental of approximately £20,000 per annum.

The tonnage originating on these canals in 1935 was approximately 1,280,000, compared with nearly 11,000,000 tons originating on other than railway-owned canals. The longest canal owned by the G.W.R. is the Kennet & Avon, 86½ miles in length, built in 1794 to link the Severn and the Thames. The traffic on this waterway last year amounted to only 17,000 tons, compared with the 40,700 tons conveyed over the 1¾ miles of the Stourbridge Extension Canal, which is the most important G.W.R. waterway from a traffic point of view.

The most important of the L.N.E.R. waterways is the Nottingham Canal, which, over 2½ miles of its length, forms part of the Trent Navigation and serves many important factories and warehouses in the city of Nottingham. The traffic on this canal last year amounted to 108,000 tons, and there were also substantial carryings on the Fossdyke Navigation. The L.N.E.R. exercises control over the Sheffield & South Yorkshire Canal by virtue of a holding of £540,000 in ordinary shares. This is a canal of some importance, the traffic over which has risen from 428,622 tons in 1925 to over 650,000 tons in recent years.

The L.M.S.R. has by far the greatest interest in canal undertakings, the most important being the Trent & Mersey, which is the principal waterway between the Mersey and the Midlands. It follows the route of the old North Staffordshire Railway, which acquired it in the 'forties, the bulk of the traffic originating in the potteries. This canal has the most extensive traffic of any railway-owned waterway, the tonnage conveyed last year being nearly 324,000.

Another important L.M.S.R. canal undertaking is the Shropshire Union, providing a second link between the Mersey and the Midlands to the south-west of the Trent and Mersey. It has a branch of 65 miles to Newtown in Central Wales, and numerous smaller branches, the total length being 194 miles. It is leased in perpetuity to the L.M.S.R., which has incurred considerable expenditure on maintenance and in the development of Ellesmere Port, the junction with the Manchester Ship Canal. Upwards of 250,000 tons per annum have been conveyed over this waterway in recent years, the 1935 figure being 294,000 tons. Other L.M.S.R. canals over which a fairly substantial traffic still passes are the Forth & Clyde, acquired by the Caledonian Railway in 1867; the Manchester, Bolton & Bury, which became the property of the Lancashire & Yorkshire Railway; and the St. Helens Canal.

In addition, the L.M.S.R. controls the Birmingham Canal under a complicated arrangement concluded in 1846 between the London & Birmingham Railway and the canal company. The latter subscribed certain capital towards the construction of the Stour Valley Railway, in return for which the London & Birmingham Railway guaranteed a minimum dividend of 4 per cent. on the canal shares, on the understanding that it was to have a controlling voice in the affairs of the canal in such year or years as it was called upon to make good a deficiency in the dividends. Until 1874 the Birmingham Canal paid its way, but since then the railway company has had to contribute sums aggregating nearly £2,000,000 towards the payment of dividends; last year's contribution was £57,000. The total length of the Birmingham Canal is 160 miles, and, although the traffic has diminished considerably since the war, it still ranks second to the Manchester Ship Canal in point of tonnage conveyed, which amounts to over 2,500,000 annually.

The Southern Railway Company's interest in canals is confined to the Gravesend & Higham, 4½ miles in length, over which 29,000 tons of traffic passed last year. The G.W.R., L.M.S.R., and Southern Railway jointly own the Kensington Canal, less than half-a-mile long, the traffic on which last year amounted to 140,000 tons. In addition, the L.M.S. & G.W. Joint Committee owns the Lydney Canal, one mile in length, over which nearly 170,000 tons of traffic passed last year.

Financial Results

The canals which passed into railway ownership were naturally those least able to hold their own in competition with the rival form of transport, and it is not surprising therefore that the companies' canal accounts record a succession of losses, with the solitary exception of the Southern Company, which is able to show a small profit on its Gravesend & Higham Canal. Having regard to the heavy cost of maintenance which has to be incurred irrespective of the quantity of traffic passing, the comparatively small losses shown by the railway companies on their canals represent a remarkable achievement.

Due to a decrease in expenditure, the G.W.R. was able to reduce its canal loss last year to £18,710, compared with over £23,000 in the previous year and £35,000 in 1929. L.N.E.R. receipts increased by £1,000 but expenditure was £5,000 more than in 1934, with the result that the net loss increased by £4,500. L.M.S.R. receipts dropped by £7,000 and expenditure increased by £8,500, resulting in a loss of £16,982 compared with only £1,388 in 1934, while the Southern Railway slightly increased its profit. It is interesting to note that although the total net loss last year of £49,453 was £15,500 more than in 1934, it compares with £64,236 in 1929 and £154,082 in 1923, thus affording ample evidence of the economies realised since the war.

CANALS

Company	Receipts		Expenditure		Loss	
	1934	1935	1934	1935	1934	1935
	£	£	£	£	£	£
G.W.R.	14,094	13,894	37,373	32,604	23,279	18,710
L.N.E.R.	36,052	37,067	45,707	51,203	9,655	14,136
L.M.S.R.	124,812	117,740	126,200	134,722	1,388	16,982
					Profit	
Southern	1,601	1,890	1,244	1,515	357	375

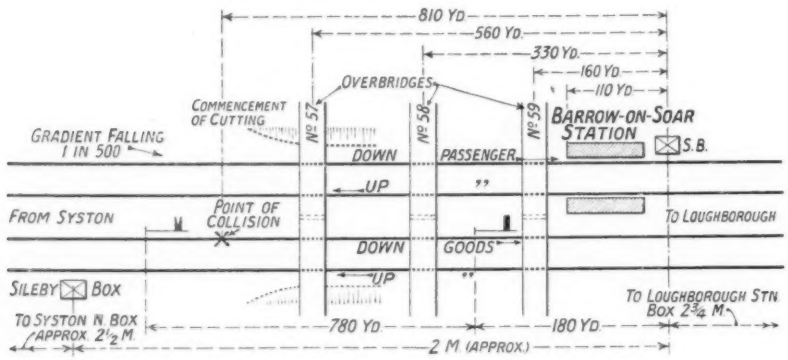
MINISTRY OF TRANSPORT ACCIDENT REPORT

Barrow - on - Soar, L.M.S.R.: January 21, 1936

The 10.50 p.m. double-headed freight train from Peterborough to Derby collided with the 3.0 p.m. empty mineral train, Brent to Toton, which had just started from Barrow down home signal. The guard of the latter train was killed, and the guard of the former slightly hurt. The 1.20 a.m. Derby to Peterborough freight, which had just started from Barrow up home, was warned by a driver, and brought almost to a stand before striking the wreckage. The Brent-Toton (unfitted) train, hauled by Garratt engine No. 4977, had 95 empty wagons and brake van. It was 640 yd. long, and weighed 661 tons. The Peterborough-Derby (unfitted) train was hauled by two 0-6-0 engines, Nos. 3095 (pilot) and 4158, fitted with steam brake, controlled by vacuum, on all wheels. It had 80 wagons, was 540 yd. long, and weighed 639 tons. The Derby-Peterborough train was drawn by engine No. 4359, of similar type to No. 4158, with 40 wagons, weighing 418 tons.

The brake van and four wagons of the Brent-Toton train were demolished, and three others derailed, becoming interlocked with the derailed pilot engine of the colliding train, and so checking the Brent-Toton train into which it had run that it parted behind the 59th wagon. The driver was unaware of the accident until stopped at Loughborough. Both engines of the colliding train were derailed, the leading wagon wrecked, and a number derailed or damaged. There was practically no damage to the up train, and but little to the permanent way. Traffic conditions had been abnormal for several days owing to adverse weather and congestion in the marshalling yards. The night was dark, with no mist, and a strong N.W. wind: the rail was probably wet from previous rain.

The accompanying diagram shows the lines and signals concerned in the accident. Between Sileby and Barrow-on-Soar there is an intermediate box called Mountsorrel (not shown) which controls the passenger lines only, and was closed at the time. The line is curved left-handed, 80 ch. radius, in rear of Barrow distant signals, then curves right-handed almost to the station. It runs into a cutting after the distant signals, in which there are three overbridges with central piers, the last of which blocks the view from Barrow box of a train standing at the down home. Trains are signalled on the goods lines by bells only, without block instruments, and Colonel Trench thought that two of the bells in Barrow box had very similar tones. The distances from that box to the various signals, &c., are shown on the diagram.



Sketch plan of lines near Barrow-on-Soar station, showing point of collision

Driver Jones of the Brent-Toton train was cautioned at Syston, and found Sileby distant on, but the home off. Barrow distant and home were on, and he whistled on coming to a stand, and again ten minutes later. After thirty minutes wait, or possibly longer, the signal was pulled off, and he moved forward, exchanging signals with the guard. After passing Barrow box a slight buffering up was felt, but he attached no importance to it, and ran forward to Loughborough, where he learned that his train was divided. Fireman Foster generally confirmed this evidence.

Driver Wilson was in charge of the pilot engine of the Peterborough-Derby train and knew the road very well. At Sileby both signals were off, as also was Barrow distant, when he sighted it at about 400 yd. When he was 150 to 200 yd. from it, he saw two red lights ahead, but not the white light which should be carried by trains on the goods line. He could not make out what the lights were, and crossed to the left-hand side, and also asked his fireman what he thought. He then realised they were on his own line, probably 100 yd. away. He made a full brake application and whistled, but although the brakes took hold, speed was hardly reduced before the impact.

Fireman Tricklebank generally confirmed his driver's statements. He jumped from the engine before the collision, and went forward to protect the up passenger line and inform the signalman at Barrow. Driver Panter and Fireman Head of the train engine gave similar evidence; they thought the red lights must be on the passenger line. After the collision, Wilson saw another train approaching on the up goods line and ran along waving a pocket torch; he was able to attract the driver's attention and the train was stopped, as already stated. Suitable protective action was taken by several of the men, and the 3.20 a.m. fitted freight, Leicester to Grimesthorpe, was stopped in time on the down passenger line.

Signalman Bettles at Sileby said the Brent-Toton train was belled to him as entering section at 2.9 a.m. He belled it forward at 2.34 a.m., and it passed him at 2.37 a.m., when he gave "train out of section." He received that signal for it at 2.43 a.m. He was confident that it was displaying the correct tail signals. The Peterborough-Derby train was belled as entering section at 3.26 a.m., and he signalled it forward at 3.34 a.m., when it passed his box under clear signals. This bell signal was duly acknowledged.

Signalman Teasdale at Barrow said that a mineral train passed him on the down goods line at 2.25 a.m., which corresponds with the block register at Sileby, as regards the train preceding the Brent-Toton train. The next bell signal was at 3.34 a.m., "entering section," for the Peterborough-Derby train. He had heard no whistle nor seen any sign of an engine at his home signal, but two or three minutes after lowering his signals he saw a headlamp coming through the bridge. Realising it could not be on the train last signalled, he replaced his distant signal and telephoned to Sileby. Bettles then said he had a record of the Brent-Toton train signalled in and out of section, but Teasdale had no knowledge of it. He was unaware of the collision until informed of it by a fireman.

Inspecting Officer's Conclusions

The primary cause of this collision was the admission of the second train, without a caution, into the section occupied by the first, and responsibility for it must lie with one or both signalmen. The only evidence bearing on this is contained in their conflicting statements and the entries in their block registers. The question as far as Bettles is concerned is whether he sent "entering section" for the Brent train and later received "train out of section," and whether these signals were duly acknowledged; and, as far as Teasdale is concerned, whether he received and sent the corresponding signals without recording either of them. There is no definite evidence on these points, and it is a question of

the inherent probabilities of the case. It is possible that an improper train register entry was made to cover up a mistake, but one is reluctant to attribute such action to a signalman of long service and good record. It seems improbable that "entering section" was not sent for the Brent train, for a Garratt locomotive and 95 wagons can hardly pass unnoticed. The responsibility for the accident must be shared by Bettles and Teasdale, but a greater share must be attributed to the former, as it seems fairly certain that Teasdale did not send "out of section" for the train. He denied having heard any engine whistles: there was a high wind blowing and the engine was 180 yd. away in a cutting beyond an overbridge, so it may well have been impossible for him to do so. Driver Jones did not send his fireman to the box, although he considered doing it, and it is to be regretted that he took no action. His contention that the company's regulations exempted him from Rule 55 is correct, and no responsibility can be properly attributed to him. It is probable that the reverse curvature of the line had some bearing on the failure of the enginemen of the colliding train to see the white side light ahead, and they cannot be blamed for not taking action sooner.

Recommendations

Block instruments would have avoided appreciable risk of mistaking the identity of the bell signals, as most likely arose in this case. Telegraph bell signals alone have been used for many years on a considerable mileage of the company's goods lines without undue risk or accident. Increasing density and speed of trains make it desirable to consider this method of working seriously, when so much attention is being given to modern safety measures on passenger lines. Local conditions, and the possibility of passenger lines being fouled as the result of accident, must be taken into account. This accident would have been avoided had Rule 55 been applicable to goods lines.

The company gave considered reasons why the rule was suspended on permissive lines worked by telegraph bell, but the accident indicates that it has a safety value on such lines, especially in certain circumstances. It may also have a value in avoiding traffic delays, and all companies should consider its possibilities in this respect, possibly with some modification of its terms, as, for example, that requiring the fireman to remain in the signal-box, and making it clear that the rule applies only to the train standing at the signal. Driver Wilson's prompt action in stopping two other trains was commendable.

NEW TILBURY HALT, L.M.S.R.—Work has been begun on a new L.M.S.R. halt, to be called Linford halt, near East Tilbury.

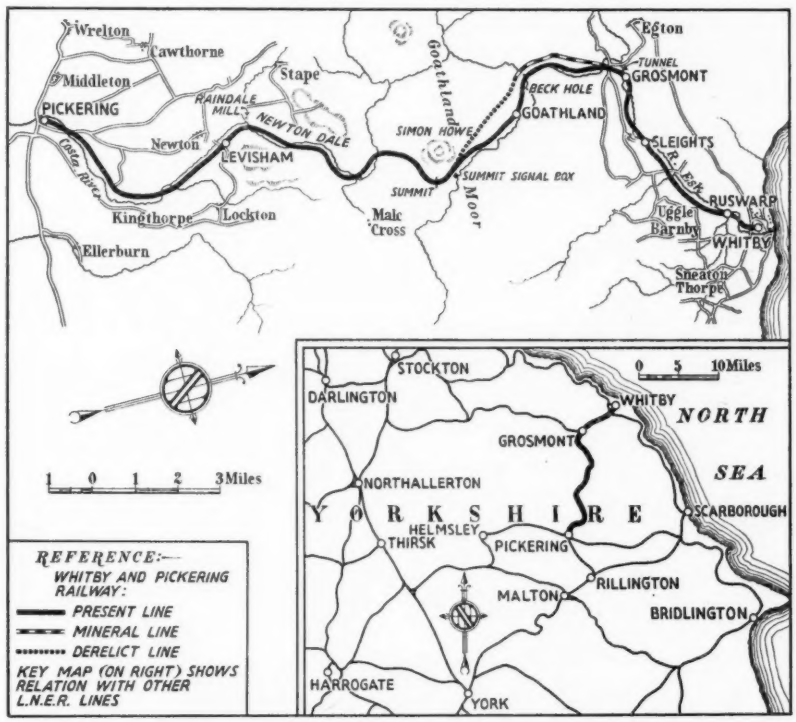
The Whitby and Pickering Railway

(*See also editorial note on page* 1021)

In an editorial note on page 1021 we mention that this week the Whitby & Pickering Railway completed one hundred years of working life throughout its entire length, and that the occasion was marked by a talk in the North Regional programme of the B.B.C. It was on the advice of George Stephenson that Pickering was adopted as the inland terminus of the first railway to serve the port of Whitby. In September, 1832, a syndicate was formed to make the necessary arrangements and application to Parliament. The Bill was unopposed, and the Whitby & Pickering Railway was incorporated by Act of May 6, 1833 (3 Will. IV, cap. 35), obtained at the comparatively small cost of £2,867 19s. 5½d. This Act is remarkable for a clause (Section 114) permitting steam locomotives, whereas in a later clause (Section 134) their use is expressly forbidden.

The first sod was cut on September 10, 1833, and by the middle of May, 1835, the works to Whinstone Dyke were sufficiently advanced to justify opening this portion for traffic. The horse-drawn coach *Premier* made an inaugural run on May 15, and on June 8 a regular twice-daily passenger service was begun over the 6¼ miles between Whitby and the Tunnel Inn, Grosmont. The original fares were 1s. outside and 1s. 3d. inside. On July 18 a second class market service was introduced with a 6d. fare. Subsequently, it appears that a local Pickering-Raindale service was begun, and, although Thursday, May 26, 1836, was the date of opening of the whole line for passenger traffic, there is reason to believe that some through goods traffic was carried before that date.

The gradients, even today, are severe, some as steep as 1 in 49, and, when the railway was opened, there was an incline (from Goathland to Beck Hole) too steep for horse haulage. Traffic was therefore worked by a rope, with water tanks on wheels to counterbalance the weight of the train. During the whole of the independent career of the Whitby & Pickering Railway only horse traction was employed and it remained an isolated line. In 1844 the York & North Midland Railway obtained powers to build a York-Scarborough line, with a branch to Pickering, and the Whitby company thereupon agreed to sell out to the larger undertaking. The sale was sanctioned by Act of June 30, 1845, which also authorised locomotive traction. The York - Scarborough line, and the branch from Rillington to Pickering, were opened on July 7, 1845. In August, 1846, locomotives were introduced on the older line between Pickering and Raindale. The first locomotive was driven into Whitby on June 4, 1847. The York & North Midland Railway was merged into the North Eastern Railway by Act of July 31, 1854.



Sketch map of the Whitby and Pickering Railway

QUESTIONS IN PARLIAMENT

Railway Electrification

Mr. Chorlton on May 20 asked the Minister of Transport whether the companies concerned had yet decided, as a result of their inquiry, to electrify the railway lines of South Lancashire and the West Riding; and, if so, which lines would be proceeded with first.

Mr. Hore-Belisha.—As soon as the railway companies inform me I will communicate with my hon. friend.

Fares and Sleeping Accommodation

Lieut.-Col. Sir W. Allen on May 25 asked the Secretary to the Treasury whether he was aware that the first class return fare between Belfast and London, without sleeping accommodation, was 120s. and that the third class and saloon fare, with sleeping accommodation, was 92s. 6d.; whether the latter privilege could be granted to Members, thereby saving 27s. 6d. each return journey to the Treasury and similarly on all other routes where sleeping accommodation was necessary and a saving to the Treasury might be effected; and would he take into consideration provision for sleeping accommodation generally to Members on journeys to and from their constituencies.

Mr. W. S. Morrison.—I am sending my hon. friend a copy of the regulations relating to Members' travelling vouchers from which he will see that provision is made for the substitution for first class travel of third class travel with sleeping accommodation where no excess cost is involved. The arrangements apply to third class and saloon fare with sleeping accommodation for a journey between London and Belfast.

Passenger Fares

Captain Strickland asked the Minister of Transport if he or the Railway Rates Tribunal had taken any action and, if so, of what nature, during the past three years to require the main line railway companies to define a chargeable distance for the purpose of fixing passenger fares generally and, in particular, season ticket rates.

Captain A. Hudson (Parliamentary Secretary).—The railway companies are precluded from charging in excess of the standard mileage rates laid down by the Railway Rates Tribunal. Any questions of interpretation are matters for judicial decision.

Djibouti Railway Traffic

Mr. Vyvyen Adams asked the Secretary of State for Foreign Affairs whether he had any statement to make on the use by the Italian invaders of Ethiopia of the railway under French control between Djibouti and Addis Ababa.

Mr. Eden.—I understand that the French Government has decided that no troops or munitions of war will be transported from Djibouti or anywhere in French territory. I am further advised that the French Government regards the transport of supplies of food, clothing, &c., from Djibouti to Addis Ababa as a commercial transaction, and that it does not propose to vary the practice followed hitherto in this respect. In the case of consignments of such stores destined for the Italian military authorities, the ordinary commercial freight rates will be payable

Mr. Cocks asked the Secretary of State for Foreign Affairs whether he was now in a position to make a statement regarding the disappearance of a British diplomatic bag on the Addis Ababa-Djibouti railway.

Mr. Eden.—Enquiries are being made by Sir Sidney Barton and by the British Vice-Consul at Djibouti and I am awaiting their report. I understand that the bag in question was a non-confidential postal packet.

Railway Rates on Foreign Coal Exports

Mr. George Hall on May 26 asked the Secretary for Mines what financial assistance in the form of subsidy or concessions in railway rates or any other assistance was given to coal exports from Germany, Poland, or any other coal-exporting country in Europe.

Captain Crookshank: I will circulate a Statement embodying those methods, so far as they have come to my knowledge, by which European countries assist their coal export trade.

Following is the statement:—Preferential rates for the movement of coal consigned to contested markets are granted by the State Railways in Poland, France, Belgium, and Czechoslovakia and by the railway company in Germany.

The German coal industry assists the sale of coal in contested markets by drawing on the proceeds of a levy on all coal sold, and German coal exporters are able in a number of markets to secure specially favourable exchange facilities through the operation of the German Government's control of foreign exchange.

In Belgium the proceeds of the tax on coal import licences are allocated to the Belgian coal industry but it is not known what use is made of this subvention.

It is understood that in Czechoslovakia the coal tax is remitted on coal for export.

In Poland and Turkey the sale of coal in contested markets is assisted by the charging of lower prices for coal for export than for coal for inland consumption.

Roads over Railway Tracks

In the House of Commons on Wednesday, May 27, Mr. Simmonds (Duddeston—U.) asked the Minister of Transport whether he had yet investigated the overway system of elevated roads over railway tracks as a method of increasing urban road facilities; and whether he was now in a position to recommend its adoption by highway authorities.

Mr. Hore-Belisha.—I would certainly approve the adoption of this system in any suitable case.

Lower Fares for Young People

Mr. Kelly (Rochdale—Lab.) asked the Minister of Transport if any reply had been made to the appeal on behalf of young people for lower fares on the railways in the London area when going to and from work.

Mr. Hore-Belisha.—Yes, sir, and the reply was to the effect that jurisdiction in this matter rests not with me but with the Railway Rates Tribunal.

London Transport Lost Property

Mr. Leonard (St. Rollox—Lab.) asked the Minister of Transport if he would state the total amount of fees collected by the lost property office of the London Passenger Transport Board since its inception, the amount expended, and how allocated.

Mr. Hore-Belisha.—I am informed by the board that during the period from January 1, 1934, to April 30, 1936, a total sum of £26,104 was received as lost property fees. Of this sum £12,171 has been allocated for the benefit of the staff of the board, and the balance has been applied towards meeting the expenses of the lost property office.

Parliamentary Notes

Progress of Railway Bills

The London Passenger Transport Board Bill was read the third time and passed in the House of Commons on May 21. It was read a first time in the House of Lords the same day. The Great Western Railway (Ealing and Shepherd's Bush Extension Railway) Bill and the L.N.E.R. (London Transport) Bill, both of which have been through the Commons, were read a second time and committed in the Lords on May 21. Petitions have been deposited against the L.N.E.R. Bill by the Corporations of East Ham, West Ham, and Hendon, and by the Middlesex County Council; and against the G.W.R. Bill by Ealing Corporation. The Royal Assent was given on May 21 to the Mersey Docks and Harbour Board Bill. On the report of the Standing Orders Committee the House of Lords agreed on May 26 that the Southern Railway Bill, with the additional provisions, be allowed to proceed. On May 27 the G.W.R. (Additional Powers), the London Passenger Transport Board, and the Southern Railway Bills were read a second time in the House of Lords. Petitions against the G.W.R. Bill have been deposited by the Devon County Council and the Paignton Urban District Council.

NOTES AND NEWS

Railway Air Services.—The summer services of Railway Air Services Limited were begun on Monday last, May 25.

Herbert Walker Avenue, Southampton.—The avenue which runs through the new docks estate at Southampton was, on May 21, named Herbert Walker Avenue, after the General Manager of the Southern Railway.

Beama Annual Dinner.—The annual dinner of the British Electrical and Allied Manufacturers' Association has been arranged to be held at Grosvenor House, Park Lane, London, W., on Tuesday, November 17, when the President, Lord Derby, will be in the chair.

London Transport Parcels Business.—The main-line railway companies are taking over, in July, the parcels business of the London Passenger Transport Board. There will then be no horses on the permanent staff of London Transport, as the last survivors—six or seven employed at the Whitecross goods depot—will be disposed of.

Birmingham-Glasgow Sleeping Car Facilities.—On July 6, the L.M.S.R. is introducing sleeping accommodation between Birmingham and Glasgow. Composite first and third-class sleeping coaches serving Birmingham, Dudley Port, Wolverhampton, and Stafford will be available on the 10.50 p.m. train from Birmingham and the 9.30 p.m. from Glasgow.

Aldgate East Station Reconstruction.—After two years of preparatory work, the London Passenger Transport Board has just begun building a new Aldgate East station about 170 yards east of the present station. The subsurface at the new site contains many sewers and conduits; about 8,000 buses and trams pass daily over the surface; and the underground train service is, of course, intense. The work is estimated to cost about £1,000,000.

Road Accidents.—The Ministry of Transport return for the week ended May 23 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year:—

	Killed, including deaths resulting from previous accidents		Injured	
England ...	101	(82)	4,279	(3,446)
Wales	5	(4)	182	(132)
Scotland ...	7	(7)	420	(385)
	113	(93)	(4,881)	(3,963)

The total fatalities for the previous week were 105, as compared with 112 for the corresponding period of last year.

Road to Link Up East Prussian Resorts.—Travellers arriving at Pillau on the East Prussian line steamers from Swinemünde and other Baltic Sea resorts, and wishing to proceed to the resorts along the Samland coastal strip at present have to go round by way of Königsberg. Now, however, Dr. Todt, Inspector-General of the German Roadways, has authorised the construction of a new road linking up Pillau directly with Brustersdorf and enabling access at Königsberg to the State motor roads intersecting the East Prussian mainland, as, for instance, the Königsberg-Insterburg road.

Accident Near Crieff, L.M.S.R.—About half a mile from Crieff station on May 20 a local train, consisting of an 0-4-4 tank engine hauling one coach, was derailed, but fortunately without injury to anyone. The train was travelling towards Crieff.

Northern Ireland Road Fares Reduced.—The Northern Ireland Road Transport Board, which has a monopoly of all passenger and goods road services in Ulster, has announced a general reduction of bus fares. Reductions of from 1d. to 9d. apply to 61 per cent. of the return fares and 52 per cent. of the single fares from Belfast to various points.

Swedish Private Railways in 1935.—The private Swedish railways report that their total traffic revenues during 1935 amounted to 116·9 million kronor against 113 million kronor for the preceding year. The expenditure rose from about 86 million kronor in 1934 to 90·7 million kronor during 1935, leaving a surplus of 26·2 million kronor against 26·9 million kronor for 1934. After deducting expenses for interest on capital invested and for renewal funds, the net profit amounted to 6·88 million kronor (£378,400 at par) against 7·07 million kronor (£388,900 at par) for 1934.

British Railway Cinema Anniversary.—Sunday last was the first anniversary of the inauguration of a railway mobile cinema in Great Britain, as it was on May 24 of last year that the original L.N.E.R. Pathé cinema coach was first attached to the 10.10 a.m. express from King's Cross to Leeds and the 3.15 p.m. from Leeds to King's Cross. It has now made approximately 600 journeys and covered 120,000 miles; the programmes have been seen by 35,000 people. It will be recalled that, so successful was this cinema coach, that a second coach was installed on March 2 last between Leeds and Edinburgh.

Eastern Belle Pullman Excursions.—Five-day season tickets, available for a journey by the Eastern Belle Pullman car express from Liverpool Street to a different holiday resort each day, are to be issued by the L.N.E.R. every Monday, beginning on June 15, at the modest fare of 25s. third class, or 37s. 6d. first class, including all Pullman supplements. The 25s. season ticket represents Pullman car travel at more than 3 miles for one penny. Separate half-day return tickets will also be issued, the fares of which will vary from 6s. 9d. third class to 11s. 3d. first class. The resorts to be visited include all the seaside towns from Clacton to Hunstanton, as well as Wroxham and North Walsham on the Broads and Skegness on the Lincolnshire coast.

Egyptian State Railways' Higher Receipts in 1935.—The Egyptian State Railway receipts for the financial year ended April 30 last amounted to £E5,132,000, compared with £E5,091,000 in the previous year, an increase of £E41,000. Telegraph receipts totalled £E171,000, an increase of £E8,000, and telephone receipts £E699,000, an increase of £E26,000, states a Reuter message.

Austrian Single-Wheeler.—One of the old 0-6-0 passenger tank engines of the Austrian Federal Railways has been rebuilt as a 2-2-2 tank engine, and is now working two- and three-coach passenger trains in Carinthia. In its present state the locomotive weighs 32 tonnes in working order and has a top speed of 50 m.p.h.; the cylinders are 13·5 in. by 18⅞ in. and the driving wheels are 55½ in. diam. The old outside Allan link motion has been retained to drive the slide valves. The boiler is arranged for either automatic coal or automatic oil firing, and has a grate area of 11¼ sq. ft. and a heating surface of 638 sq. ft.

Elgin & District Motorbus Company Absorbed.—Arrangements have been concluded whereby, on June 15, the services of the Elgin & District Motor Bus Co. Ltd. will be taken over by W. Alexander & Sons Ltd. (an associate of the L.N.E.R. and L.M.S.R.). It is reported that Alexander, one of the S.M.T. group of companies, is paying approximately £20,000 for the undertaking, which works ten vehicles on eight routes. The business was established by Macdonald & Aitkenhead in 1919, with a service between Lossiemouth and Burghead. The Elgin company was incorporated on April 16, 1920, and rapidly extended its services to embrace all Speyside.

British Oxygen Company's New Headquarters.—At the invitation of the British Oxygen Co. Ltd., we were enabled to inspect yesterday the new head office of the company at Thames House after its official opening, and were greatly impressed by the arrangements of the offices and their completely up-to-date nature. In fact, it may be said that the new head office is symbolic of the great progress made by the company in the past 50 years. From 1886 to 1921 the head office was at the premises in Horseferry Road, where the company's first plant was installed for the production of oxygen. In 1921 the head office was transferred to a new building at Edmonton, which today houses extensive plant for the production of machines and equipment for use in applying to the needs of industry the gases produced in the company's numerous factories throughout the British Empire. In 1933 the head office was again removed to the accommodation in Victoria Station House, Westminster, which had previously been

occupied by Allen-Liversidge Limited, merged with the British Oxygen Company in 1931. Now the great growth of the company has dictated the present move to Thames House.

Istanbul-Ankara Air Service.—On Monday last (May 25) a daily air service was inaugurated between Istanbul (Constantinople) and Ankara (Angora). The machines being used are De Havilland Dragons, and the Turkish pilots have been trained in England.

An Irish Channel Air Service.—On Wednesday (May 27) regular air lines across the Irish Channel were inaugurated jointly by Aer Lingus Teóranta and the Blackpool & West Coast Air Services Limited. Two routes are being worked, namely, Dublin (Baldonnel) to Bristol (Whitchurch), and Dublin to Liverpool (Speke) via the Isle of Man.

Rail Welding.—In the editorial article entitled "Eliminating the Rail Joint" which appeared in THE RAILWAY GAZETTE of March 6, it was stated that when the suburban line connecting Berlin with Wannsee was electrified in 1933 it was relaid with 60-metre rails, consisting of 30-metre lengths joined end to end by the flash resistance method. Actually the Thermit process was used and 15-metre rails were so welded *in situ*.

London Transport Trolleybus Progress.—By the end of the present year the London Passenger Transport Board plans to have 750 trolleybuses in service. The order in which routes will be converted this year is as follows: 1, Acton–Edgware; 2, Cricklewood–Finchley; 3, Stonebridge Park Depot (Cricklewood)–Paddington (providing a service from Paddington to Edgware); and 4, Stonebridge Park Depot (Cricklewood)–Sudbury (providing a through service from Paddington to Sudbury). The Shepherd's Bush to Uxbridge route will also be converted this year. With the introduction of trolleybuses on some of these routes about 100 Feltham-type tramcars will be released. These will be transferred, as they become available, to the Streatham depot.

G.W.R. Ambulance Gold Medallists' Outing.—The fourteenth annual outing of G.W.R. ambulance gold medallists was held at Leamington Spa on Saturday, May 23. This popular function is a purely unofficial one organised by holders of the company's gold efficiency medal. The medallists, representing all grades of the service and all parts of the line, numbered, including wives, about 350, and at the luncheon at the Town Hall, the Mayor, Alderman C. H. Southern, J.P., extended them a hearty welcome to Leamington. The gathering was presided over by Mr. H. Adams-Clarke, who spoke of the rapid increase in the number of efficiency awards held by members of the staff. At the last gathering at Leamington in 1923 there were only 255 holders of the award, and this number had now grown to over 3,400. He particularly congratulated Mr. F. Overbury, Secretary of the Birmingham Division, who, with his committee, was responsible for the organisation of the gathering, on having been invested, on the previous afternoon at St. John's Gate, with the honour of Serving Brother of the Order of St. John of Jerusalem.

New Name-boards for L.M.S.R. Signal Boxes.—In order to enable the staff more easily to observe the names of signal boxes, the L.M.S.R. is providing all new boxes (and existing ones when repainted) with two name-boards, one of which is fixed at each end of the signal box under the gable. The present system of having one board, usually fixed at the centre of the structure, will be abandoned. The new name-boards have white lettering on a black ground.

Cheap Railway Facilities for County Cricket Matches.—The British main-line railways are co-operating with county cricket clubs in order to assist the attendance at cricket matches during the season by issuing cheap tickets at about a single fare for the return journey from all stations in the home county, and stations within a radius of 30 miles of the towns where county cricket matches are being played. These tickets are available by any train arriving at provincial destinations between 8.30 a.m. and 3.30 p.m. on the outward journey and for return by any train on the day of issue.

Rothesay Tramways.—The Rothesay Tramways Co. Ltd. is seeking permission from the Ministry of Transport to abandon its tramway on September 30 next, at the end of the summer season. The line was electrified on August 19, 1902, and extended to Ettrick Bay on July 14, 1905. In June, 1925, the company introduced motor buses, and at present has more than a dozen in service. A Provisional Order granted in 1930 permitted discontinuance of the tramcar services during the period October to May inclusive and substitution of buses. The company was formerly a subsidiary of the British Electric Traction Co. Ltd., but the control was acquired in November, 1931, by the Scottish Motor Traction Co. Ltd. in connection with the extensive rail and road co-ordination scheme in Scotland which we set out on page 428 of our issue of March 24, 1933.

Argentine Road and Rail Development.—An official decree issued on May 25 announces the approval by the Argentine Government of expenditure totalling 300,000,000 pesos (approximately £16,700,000)—an increase of 150,000,000 pesos on the original estimate—for the completion of the highway network scheme by 1942. It is also announced that an important agreement has been reached between the Government and the railway companies removing obstacles which have stood in the way of railway development. The works will now be carried out and questions regarding financial commitments as between the Government and the companies will be submitted to the Courts for arbitration, according to the Reuters correspondent in Buenos Aires.

The New Düsseldorf Station.—What is claimed will be the most up-to-date railway station in Europe is nearing completion at Düsseldorf. Particular attention is being paid by the German State Railway to the appointments of the waiting rooms, and two of Germany's leading artists, Professor Adolf Nunzer and Georg Hacker, have been commissioned to paint the mural decorations.

Irish Railway Shopmen's Wages.—The Great Southern Railways Company has agreed to restore 2½ per cent. of the 10 per cent. deduction to engineering shopmen in the Dublin area as from April 1 last, and a further 2½ per cent. from June 1. It was agreed between the parties that a further conference would be held to discuss piece rates, and to define the company's obligations under the new agreement, which will last for a period of 18 months.

The Severn Bridge Bill Rejection.—On Wednesday the Monmouthshire County Council protested against the rejection by the Parliamentary Committee of the Severn Bridge Bill, which it promoted jointly with the Gloucestershire County Council. The Monmouthshire County Council, moreover, resolved to ask the Ministry of Transport and the Government to undertake to build a bridge across the River Severn as a national project. Alderman Panes said that the rejection of the Bill had struck a heavy blow to the possibilities of opening out South Wales. The decision of the committee had proved the powerful influence of the railways. On page 1046 we reproduce an article by Sir James Milne, General Manager of the G.W.R., showing that the favourable effect of such a bridge on South Wales industrial and tourist traffic would be very small, and would be more than counterbalanced by the adverse effect on the railway.

Compensation for Dismissal.—An award was made on May 21 in claims originally put forward in 1925 by sixteen employees of the former Taff Vale and Cardiff Railways for compensation under the Railways Act, 1921. On the amalgamation in 1922 of these undertakings with the Great Western Railway Company eleven dredgermen employed at Penarth and five at Cardiff were placed in a lower grade, but remained employed until 1925, when the eleven Penarth men were dismissed. Sir James Greig, K.C., the arbitrator first appointed, died in 1933, and the hearing before the second arbitrator, Mr. J. M. Gover, K.C., was seriously delayed by the deaths of important witnesses and others intimately concerned with the case. The hearings together lasted seventy days. The arbitrator has now awarded compensation to the eleven Penarth men, in sums ranging from £10 to £200. The claims of the Cardiff men were disallowed.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 21st Week			Totals to Date		
	1936	1935	Inc. or Dec.	1936	1935	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,917 mls.)						
Passenger-train traffic...	448,000	437,000	+ 11,000	8,562,000	8,557,000	+ 5,000
Merchandise, &c. ...	496,000	466,000	+ 30,000	9,910,000	9,376,000	+ 534,000
Coal and coke ...	205,000	221,000	− 16,000	5,406,000	5,169,000	+ 237,000
Goods-train traffic ...	701,000	687,000	+ 14,000	15,316,000	14,545,000	+ 771,000
Total receipts	1,149,000	1,124,000	+ 25,000	23,878,000	23,102,000	+ 776,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	286,000	273,000	+ 13,000	5,629,000	5,626,000	+ 3,000
Merchandise, &c. ...	329,000	328,000	+ 1,000	6,781,000	6,510,000	+ 271,000
Coal and coke ...	221,000	220,000	+ 1,000	5,092,000	4,860,000	+ 232,000
Goods-train traffic ...	550,000	548,000	+ 2,000	11,873,000	11,370,000	+ 503,000
Total receipts	836,000	821,000	+ 15,000	17,502,000	16,996,000	+ 506,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	187,000	181,000	+ 6,000	3,588,000	3,601,000	− 13,000
Merchandise, &c. ...	193,000	188,000	+ 5,000	3,901,000	3,737,000	+ 164,000
Coal and coke ...	96,000	101,000	− 5,000	2,222,000	2,158,000	+ 64,000
Goods-train traffic ...	289,000	289,000	—	6,123,000	5,895,000	+ 228,000
Total receipts	476,000	470,000	+ 6,000	9,711,000	9,496,000	+ 215,000
S.R. (2,154 mls.)						
Passenger-train traffic...	283,000	271,000	+ 12,000	5,407,000	5,411,000	− 4,000
Merchandise, &c. ...	66,000	62,500	+ 3,500	1,261,000	1,256,500	+ 4,500
Coal and coke ...	26,000	27,500	− 1,500	716,000	662,500	+ 53,500
Goods-train traffic ...	92,000	90,000	+ 2,000	1,977,000	1,919,000	+ 58,000
Total receipts	375,000	361,000	+ 14,000	7,384,000	7,330,000	+ 54,000
Liverpool Overhead ... (6½ mls.)	1,115	1,130	− 15	23,410	23,277	+ 133
Mersey (4½ mls.) ...	3,636	3,555	+ 81	85,681	84,964	+ 717
*London Passenger Transport Board ...	570,300	543,400	+ 26,900	25,614,700	25,290,500	+ 324,200
IRELAND						
Belfast & C.D. pass. (80 mls.)	2,078	1,985	+ 93	38,778	40,416	− 1,638
,, ,, goods	557	569	− 12	11,369	10,435	+ 934
,, ,, total	2,635	2,554	+ 81	50,147	50,851	− 704
†Great Northern pass. (543 mls.)	9,350	7,900	+ 1,450	168,800	163,900	+ 4,900
,, ,, goods	9,750	10,150	− 400	198,150	188,150	+ 10,000
,, ,, total	19,100	18,050	+ 1,050	366,950	352,050	+ 14,900
†Great Southern pass. (2,076 mls.)	30,707	27,382	+ 3,325	582,979	577,262	+ 5,717
,, ,, goods	38,956	35,992	+ 2,964	839,584	793,197	+ 46,387
,, ,, total	69,663	63,374	+ 6,289	1,422,563	1,370,459	+ 52,104

* 47th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year; last year's figures are, however, adjusted for comparative purposes
† 20th week

Hunt's Bank Athletic Festival

The twenty-fifth annual L.M.S.R. Hunt's Bank Athletic Festival was held at Blackpool on Saturday last, May 23. In spite of the unsettled weather some 11,000 members of the staff and their friends were present in the gaily decorated Blackpool football ground to watch an afternoon of well-contested sports. Among the officers, retired officers, and guests present, were:—

Messrs. J. Alexander, B. S. Bamford, W. S. Beeson, The Mayor and Mayoress of Blackpool, Messrs. F. Bullough, Ashton Davies, W. Rostron Duckworth, M.P., W. Holmes, G. O'B. Hamilton, W. O. Hickson, H. G. Humphreys, R. C. Irwin, J. Taylor Jones, W. R. Jones, D. P. Lees, E. H. Morris, J. H. Openshaw, W. E. Preston, J. Purves, J. Roland Robinson, M.P., L. F. Rowlandson, W. Sadler, F. S. Sharp, G. C. Senior, J. Wood and W. H. Wood.

The programme included 29 events, most of which were flat races. There were many fine performances throughout in both the men's and ladies' events, and the finish to the mile, the last event on the programme, provided a fitting climax to the day's sport. The veterans, too, showed surprising pace especially in the half-mile walking handicap. The principal trophies were won as follow:—

"Sir Josiah Stamp" Inter-departmental Cup: Divisional Superintendent of Operations Department.

"Sir G. Pilkington" Cup for men's relay race: Divisional Superintendent of Operations Department.

"Sir G. Pilkington" Cup for ladies' relay race: District Engineer's Department.

The prizes and trophies were distributed at the close by Mrs. G. N. Shawcross, who was accompanied by Mr. Shawcross, who retired at the beginning of this month from the position of Mechanical Engineer, Horwich. Mrs. Shawcross, to whom a handsome bouquet was presented by little Miss Valerie Ackroyd, was introduced to the assembly by Mr. F. H. Cowell, District Passenger Manager, Manchester, and Chairman of the Festival Committee.

British and Irish Railways Stocks and Shares

Stocks	Highest 1935	Lowest 1935	Prices May 27, 1936	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	55½	44½	47½	−1
5% Con. Prefce. ...	124	108	121½	—
5% Red.Pref.(1950)	117	106¾	111½	+1
4% Deb.	118½	108	115½	—
4½% Deb. ...	122	110	118½	—
4½% Deb. ...	129½	118	127½	—
2½% Deb.... ...	82¼	68½	78	—
5% Rt. Charge ...	137	128	135½	—
5% Cons. Guar. ...	136¾	120½	131½	—
L.M.S.R.				
Ord.	25516	16	23	−½
4% Prefce. (1923)	58¼	43½	69½	−1½
4% Prefce. ...	87½	73½	86½	−½
5% Red.Pref.(1955)	107	97¾	107½	—
4% Deb.	110¼	99½	110½	—
5% Red.Deb.(1952)	119116	111516	116½	—
4% Guar.... ...	105⅝	95½	105	−½
L.N.E.R.				
5% Pref. Ord. ...	15⅞	8¼	10	−1
Def. Ord.	7916	4¾	5⅛	−¼
4% First Prefce....	74¾	48	68	−1
4% Second Prefce.	31⅝	16¼	26	−1
5% Red.Pref.(1955)	92¼	71	94½	—
4% First Guar. ...	10311/16	93	102	−1
4% Second Guar.	98¾	82½	97	−½
3% Deb.	86	75	85	+½
4% Deb.	109¼	98½	109	—
5% Red.Deb.(1947)	118½	106½	112½	—
4½% Sinking Fund Red. Deb.	112½	108	110	—
SOUTHERN				
Pref. Ord.... ...	87½	69⅝	94	—
Def. Ord. ...	25¹³16	16¾	23	−½
5% Prefce. ...	124	108¼	123	—
5% Red.Pref.(1964)	117¾	109½	118½	—
5% Guar. Prefce.	136½	121½	131½	—
5% Red.Guar.Pref. (1957)	121¼	112½	118	—
4% Deb.	116¾	107	114	—
5% Deb.	138	130¼	138½	—
4% Red. Deb. 1962–67	115	106½	115½	—
BELFAST & C.D.				
Ord.	9	4	6	−3
FORTH BRIDGE				
4% Deb.	111¼	104½	105½	—
4% Guar.... ...	109⅞	104	106½	—
G. NORTHERN (IRELAND)				
Ord.	20	7	18¼	—
G. SOUTHERN (IRELAND)				
Ord.	57½	14½	59¼	+¼
Prefce.	50	25¼	60	—
Guar.	88¾	51¼	87½	−1
Deb.	86¼	70	90½	−¾
L.P.T.B.				
4½% "A" ...	130	119¾	125½	—
5% "A" ...	139¾	130	135½	—
4½% "T.F.A." ...	113¾	108	110	—
5% "B"	131½	122¾	129	—
"C"	109½	91	103	—
MERSEY				
Ord.	23⅛	9¼	26½	—
4% Perp. Deb. ...	100½	93⅛	99½	+2
3% Perp. Deb. ...	75½	67	76	—
3% Perp. Prefce.	62	47¼	64½	—

CONTRACTS AND TENDERS

The British Oxygen Co. Ltd. has received an order for a 55-in. Universal oxygen cutting machine and accessories for the Buenos Ayres Great Southern Railway.

South African Locomotive Orders for Germany

The South African Railways & Harbours Administration has placed orders for 40 new class 19 C locomotives. Twenty are to be built by Fried. Krupp, A.G., of Essen, Germany, at a total cost of £112,614, and the remaining twenty by Borsig Locomotivwerke, G.m.b.H., of Hennigsdorf, Germany, at a cost of £113,300.

In connection with the above contracts FAG ball or roller bearings, manufactured by the Fischer Bearings Co. Ltd., have been specified for application to the expansion link.

The South African Railways and Harbours Administration has placed orders for points and crossings with the following: Patent Shaft & Axletree Co. Ltd. (£16,533); Fried. Krupp, A.G. (£1,813); Bochamer Verein (£1,813); and Dortmunder Hoerde Hatteverein (£1,798).

The South African Railways and Harbours Administration has also placed orders as follow: Hadfields Limited, diamond crossing; and Anderston Foundry Co. Ltd., diamond and scissor crossing.

Steam Railcars for F.M.S.

The Sentinel Waggon Works Limited has received an order from the Crown Agents for the Colonies for three articulated steam railcars for the metre-gauge lines of the Federated Malay States Railways. The bodies, underframes and bogies for these steam railcars are to be supplied by the English Electric Co. Ltd.

Alfred Herbert Limited has received an order from the Leopoldina Railway for one No. 9 combination turret lathe.

Leyland Motors Limited has recently received an order from the New South Wales Government Tramways for 11 three-axle trolleybuses.

The South Indian Railway Administration has placed the following orders to the inspection of Messrs. Robt. White & Partners:—

Smith & MacLean Limited, 3,490 panel sheets for carriages.
Beckett, Laycock & Watkinson, 22,000 Beclawat metal louvres.
H. H. Robertson Limited, 300 Robertson ventilators for carriages.

The Bombay, Baroda & Central India Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton:—

Royal Hungarian Iron, Steel & Machine Works, 400 pairs of wheels and axles.
John Baker & Bessemer Limited, 82 carriage and wagon axles.
Steel, Peech & Tozer Limited, 164 carriage and wagon tyres.
Davies & Metcalfe, 325 sets of injector cones.
The British Isothermos Co. Ltd., 64 Isothermos axleboxes.

The Fiat Company, of Turin, has received an order for 25 oil-engined 40-seater Littorina railcars from the Italian State Railways. These cars are additional to the order for 100 vehicles placed last year, most of which have been delivered. The new cars are to have a buffet, and will be powered by two 145-b.h.p. Fiat engines with mechanical transmission.

Railbus and Trailer for South America

D. Wickham & Co. Ltd. has received orders from the Peruvian Corporation for one 60-seat railbus with double power bogies, each fitted with a Ford V8 type petrol engine, and a 60-seater trailer vehicle.

Large French Railway Contracts

In connection with the electrification of the Tours-Bordeaux line of the Paris-Orleans Railway, orders have been placed, says Reuter, for locomotives to a total value of 70 million francs. Twenty-four passenger and freight locomotives of the 24 B.B. type have been ordered, 17 from the Alsthom Company and seven jointly from that company and the Siemens works. Fourteen 2D2 type express engines have also been ordered. Seven are to be built by Le Matériel de Traction Electrique (Schneider, Westinghouse, Jeumont), and the mechanical parts are to be provided by Schneider's. The remaining seven have been ordered from the Oerlikon Company, and in this case the Société de Construction des Batignolles will be responsible for the mechanical parts. The Paris-Orleans Railway has also awarded another contract for eight locomotives of a similar type for its Vierzon-Brive line, the electrical equipment for which is to be supplied by the Compagnie Electro-Méchanique and the mechanical parts by the Fives-Lille concern.

Apart from its electrification programme the Paris-Orleans Railway has also placed orders for 45 passenger coaches, 20 of which are third class, 15 second class, and 10 mixed first and second class. The 20 third class coaches are to be built by the Entreprises Industrielles Charentaises. The contract for the 15 second class coaches has been awarded to the Etablissements Soulé at Bagnères-de-Bigorre, and the Société Industrielle de Bacalan has received the order for the ten composite coaches.

The French State Railways Administration has ordered 27 main-line third class metal passenger coaches from the Entreprises Industrielles Charentaises. These light-construction coaches will be streamlined and will rest on welded tubular beams.

The Coventry Machine Tool Works has received an order for one No. 2 Covmac horizontal forging machine for the Buenos Ayres Great Southern Railway.

The Pneumatic Engineering Appliances Co. Ltd. has received orders from the Buenos Ayres Great Southern Railway for an oil-fired spring furnace, spring banding furnace, forging furnace and drop hammer furnace.

SKY SIGN AT COLOMBO.—The construction and equipment of the Ceylon Tea Propaganda Board's new sky sign at Colombo, which is visible 25 miles out at sea, was undertaken by Callender's Cable & Construction Co. Ltd. The firm supplied all the wiring and neon lighting, as well as supplying and erecting the two 160-ft. towers and the 230-ft. transverse members which carry the lettering.

A 58-ton casting supplied by the Grimesthorpe foundry of the English Steel Corporation Limited, to the order of Davy Brothers Limited. It measures 21 ft. × 10 ft. 6 in. × from 5 ft. 9 in. to 2 ft. 10½ in. in thickness

OFFICIAL NOTICES

Bengal-Nagpur Railway Company Limited

THE Directors are prepared to receive Tenders for :—

9 SUPERHEATED BOILERS FOR C CLASS ENGINES.

Specification and Form of Tender can be obtained at the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after Thursday, 28th May, 1936.

A fee of 20s. will be charged for each copy of the Specification, which is *NOT* returnable.

Tenders must be submitted not later than Noon on Friday, 12th June, 1936.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,
T. R. WYNNE,
Managing Director.

The Buenos Ayres Great Southern Railway Company Limited

NOTICE.

THE Directors of the Buenos Ayres Great Southern Railway Company Limited hereby give notice that the Register of Debenture Stockholders will be closed from Wednesday, the 3rd June, to Tuesday, the 16th June, 1936, both days inclusive.

By Order of the Board,
N. F. E. GREY,
Secretary.

River Plate House,
Finsbury Circus,
London, E.C.2.
27th May, 1936.

PATENTS for Inventions, Trade Marks. King's Patent Agency, Ltd. (B. T. King, Registered Patent Agent). Advice, Handbook and Consultations free.—146A, Queen Victoria Street, E.C.4. 'Phone City 6161. References and experience of the Company and its founder over 50 years.

London & North Eastern Railway

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the warrants for Interest on the Company's 3 per cent. and 4 per cent. Debenture Stocks and 4½ per cent. Sinking Fund Debenture Stock for the half-year ending 30th June, 1936, the balances will be struck as at the close of business on 11th June, and Interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the above mentioned Stocks should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5 p.m. on 11th June.

By Order,
JAMES McLAREN,
Secretary.

Marylebone Station,
London, N.W.1.
29th May, 1936.

RAILWAY AND OTHER REPORTS

Emu Bay Railway.—After making the usual provision for depreciation, the accounts for 1935 show a loss of £412, which has increased the debit balance to be carried forward fo £7,074. As there is no profit available, no payment on account of interest for the 12 months could be made to the holders of either the 4½ per cent. or the 5 per cent. redeemable debenture stock.

Bombay, Baroda & Central India Railway.—The directors will propose, at the general meeting to be held in July next, the payment, in addition to the half year's guaranteed interest of £1 10s. per cent., of a final dividend for the financial year ended at March 31, 1936, of £1 10s. per cent., making a total payment in July next of £3 per cent., less income tax. The return on the capital stock for the whole year will, therefore, be £6 per cent., less income tax, the same as for the previous year.

Franco-Ethiopian Railway. The report of the Cie du c. de f. Franco-Ethiopien de Djibouti à Addis-Abéda for the year 1935 states that, owing to the conflict between Italy and Abyssinia, the railway was adversely affected, and shows a net profit of fr. 6,973,201, against fr. 7,137,386 for 1934. A dividend of fr. 181·80 was declared on the capital shares and of fr. 182·50 on the founder shares; the "action de jouissance" are to receive fr. 165 a share. An interim dividend was paid in December last, and the balance is payable as from May 28.

Maidstone & District Motor Services Limited.—Controlled jointly by the Southern Railway Company and Tilling & British Automobile Traction Limited, this company secured for the year ended March 31, 1936, a profit of £108,441 (against £74,528 for 1934-35), to which must be added £20,191 brought forward from the previous year. The dividend on the 6½ per cent. cumulative preference shares takes £13,000, and the dividend for the whole year of 12½ per cent. on the ordinary shares will require £57,500, against £50,000. The rate of distribution is the same as for 1934-35, but on a larger capital. It is proposed to add £37,409 (against £11,590) to the reserve fund, and to carry forward £20,723. The remaining £100,000 of authorised capital has been issued as ordinary shares, making the ordinary share capital £500,000. Autocar Services Limited, of Tunbridge Wells, a subsidiary, has been liquidated and the assets absorbed by the Maidstone company. The whole of the share capital of the Hastings Tramways Company has been purchased, also the road passenger businesses of the Victor Motor Transport Co. Ltd. and R. & J. Bennett, the express carriage business of Midland Comfy Coaches Limited, and the stage carriage business of Mr. J. Killick. During the year the Chatham & District Traction Company has exercised its right and redeemed the Maidstone company's holding of 5 per cent. preference shares in the Chatham company.

B.E.T. Electricity Supply Co. Ltd.—The first report of this company, covering the 14¾ months to March 1, 1936, shows a revenue of £50,842. After providing for debenture interest, income tax, and expenses there is a profit of £29,359. After writing off preliminary expenses of £3,909, there remains £25,450. The directors recommend a dividend at the rate of 3 per cent., which requires £20,256, carrying forward £5,193. The company was incorporated on December 8, 1934, to take over from the British Electric Traction Co. Ltd. (of which it is a subsidiary) holdings in electricity supply and power companies.

TILLING & BRITISH AUTOMOBILE TRACTION LIMITED.—At meetings of the shareholders of Tilling & British Automobile Traction Limited held recently at the company's new registered offices, Brettenham House, Strand, W.C., resolutions were unanimously passed altering the articles of association, increasing the capital to £3,550,000 by the creation of 850,000 additional ordinary shares of £1 each, and authorising the issue of a capital bonus of one fully-paid ordinary share for every three ordinary shares held. The Chairman, Mr. John F. Heaton, who presided, said that, in the early days of their associated and subsidiary operating companies, relatively small dividends were declared and any surplus was usually allowed to remain in the business. Reserves thus created were of assistance in the development which followed, but, as in the course of years the undertakings became stabilised, it was decided to provide for the permanent retention of those reserves in the business, and consequently shares were issued on bonus terms. Tilling & British Automobile Traction Limited had participated in those issues, but up to the present the shares thus received had not been capitalised.

ANNUAL MALARIA CONTROL COURSE.—The annual Malaria Control course for engineers, planters, &c., will be held at the Ross Institute of Tropical Hygiene, Keppel Street (Gower Street), London, W.C.1, beginning on Monday, June 22, 1936, at 10 a.m. The course will be under Sir Malcolm Watson, Director of the Ross Institute, and will last five days. With the exception of Friday, June 26, there will be no lectures in the afternoon. The course is mainly for engineers and others coming from, and laymen proceeding to the tropics, but doctors and missionaries may also attend. It includes instruction on mosquitoes and their habits, drainage and other measures for the prevention of malaria, and is illustrated by lantern slides, films, demonstrations of the living insect in the various stages of its history, and a practical demonstration on Hampstead Heath. The course is free, and application to attend it should be sent in as early as possible to the Organising Secretary at the above address. The most convenient underground railway stations serving the school are Tottenham Court Road, Goodge Street, and Russell Square. Luncheon can be obtained at the school.

Railway Share Market

Largely owing to holiday influences most sections of the Stock Exchange experienced a falling off in business this week. Home railway stocks reflected the general tendency, but the further movement of prices against holders is attributed more to a decline in demand than to selling pressure. In fact, having regard to general market conditions, prices are perhaps rather better than might have been expected earlier in the week. The £60,000 aggregate increase in the traffics of the Home railways for the past week was regarded as satisfactory, although the disposition in the market had been to budget for a larger increase.

Southern preferred and deferred are lower on balance at 93½ and 23 respectively, but they were firmer following publication of last week's traffic figures, the increase of £14,000 in the latter being regarded as encouraging. L.M.S. stocks failed to benefit from the fact that the railway's traffics continue to show the largest rate of increase, but the ordinary was steadier later, although the 1923 preference has declined rather sharply to 69. The latter appears a very moderate valuation having regard to the indications that the margin of profits over the full dividend on this stock seems likely to show a good increase this year. It is interesting to note that Southern deferred and L.M.S. ordinary are now both quoted at 23, which presumably indicates they are considered to have roughly the same chances of entering the dividend list for the current year. The price of Southern deferred reflects to some extent the fairly confident belief that later in the year the rate of increase in its traffic receipts may be speeded up favourably. It is of course realised that the question of the resumption of dividends may turn a great deal on the outcome of the wages position. L.N.E.R. second preference has moved down to 25 and Great Western ordinary to 47¼. Guaranteed and debenture stocks show no changes of importance.

A better tendency was observable in foreign railway stocks on Wednesday. Argentine stocks came in for speculative buying on the view that prices probably more than discount the continued disappointing trend in traffic movements. B.A. Pacific was fractionally better at 7½, while the 4½ per cent. debentures gained two points to 43½. Improvement was also subsequently shown by B.A. Gt. Southern, B.A. Western and Central Argentine issues. Cordoba Central debentures fluctuated. San Paulo was in good request. Canadian Pacific improved and the American railroad issues were higher.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1935-36	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1935	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1935	Prices: Lowest 1935	Prices: May 27, 1936	Yield % (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	834	24.5.36	12,860	+ 1,340	21	278,610	259,520	+ 19,090	Ord. Stk.	23	14 15/16	20	Nil
	Argentine North Eastern	753	23.5.36	9,689	+ 1,586	47	372,192	349,688	+ 22,504	„	7	4	4 1/2	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	49 1/2	30	47 1/2	8 7/16
	Bolivar	174	Apr., 1936	7,150	+ 460	17	26,900	26,300	+ 600	6 p.c. Deb.	13	5	10	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	14	11	14	3 9/16
	Buenos Ayres & Pacific	2,806	23.5.36	90,717	— 4,628	47	4,004,035	3,734,926	+ 269,109	Ord. Stk.	10 1/2	4 7/8	8	Nil
	Buenos Ayres Central	190	9.5.36	$70,200	— $44,100	45	$4,837,460	$4,934,300	— $96,840	Mt. Deb.	21	10	17 1/2	Nil
	Buenos Ayres Gt. Southern	5,084	23.5.36	109,283	— 14,406	47	6,121,072	6,771,103	— 650,031	Ord. Stk.	27	13 1/2	15 1/2	Nil
	Buenos Ayres Western	1,930	23.5.36	46,357	— 785	47	2,144,503	2,136,422	+ 8,081	„	24	10	13	Nil
	Central Argentine	3,700	23.5.36	111,675	— 32,715	47	5,552,735	5,720,327	— 167,592	„	17 7/8	7	10	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	9	3 1/4	6 1/2	Nil
	Cent. Uruguay of M. Video	273	16.5.36	11,067	+ 1,417	46	513,109	628,462	— 115,353	Ord. Stk.	8 1/2	3	4	Nil
	Do. Eastern Extn.	311	16.5.36	1,979	— 443	46	94,806	89,510	+ 5,296	—	—	—	—	—
	Do. Northern Extn.	185	16.5.36	1,506	+ 318	46	67,457	51,295	+ 16,162	—	—	—	—	—
	Do. Western Extn.	211	16.5.36	729	+ 221	46	40,239	34,875	+ 5,364	—	—	—	—	—
	Cordoba Central	1,218	23.5.36	26,260	— 80	47	1,306,490	1,315,980	— 9,490	Ord. Inc.	4	1	1 1/2	Nil
	Costa Rica	188	Mar., 1936	20,510	+ 2,253	39	127,429	149,326	— 21,897	Stk.	35	30	36	3 9/16
	Dorada	70	Apr., 1936	13,600	+ 2 900	17	52,100	44,100	+ 8,000	1 Mt. Db.	103 5/8	102 1/2	104 1/2	5 1/4
	Entre Rios	810	23.5.36	11,240	+ 1,116	47	503,483	570 020	— 66,537	Ord. Stk.	15	6 1/2	8 1/2	Nil
	Great Western of Brazil	1,082	23.5.36	5,400	— 100	21	176,600	186 000	— 9,400	Ord. Sh.	1/2	5/16	1/2	Nil
	International of Cl. Amer.	794	Mar., 1936	$569,809	+ $100,752	13	$1,563,107	$1,307,612	+ $255,495	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	1/2	3/32	1/2	Nil
	La Guaira & Caracas	22 3/4	Apr., 1936	4,415	— 545	17	17,375	15,500	+ 1,875	Stk.	8 1/2	8	8 1/2	Nil
	Leopoldina	1,918	23.5.36	15,221	+ 3,923	21	354,676	336,590	+ 18,086	Ord. Stk.	8 1/2	2 1/2	7	Nil
	Mexican	483	21.5.36	$314,400	+ $22,700	20	$5,310,300	$4,936,700	+ $373,600	„	1 1/2	1/4	3/4	Nil
	Midland of Uruguay	319	Apr., 1936	7,396	+ 1,035	43	72,302	99,749	— 27,447	„	1 1/2	1 1/2	1 1/2	Nil
	Nitrate	401	15.5.36	4,384	— 1,055	19	58,029	55,133	+ 2,896	Ord. Sh.	64/-	42/-	2 1/4	Nil
	Paraguay Central	274	23.5.36	$2,987,000	+ $1,086,000	47	$102,790,000	$54,835,000	+ $47,955,000	Pr. Li. Stk.	80 1/2	60	77	7 15/16
	Peruvian Corporation	1,059	Apr., 1936	83,397	+ 15,092	43	786,623	625,461	+ 161,162	Pref.	10 5/8	6 7/16	12	Nil
	Salvador	100	16.5.36	¢16,550	— ¢2,425	46	¢904,096	¢972 227	— ¢68,131	Pr. Li.Db.	65	61	55	9 1/16
	San Paulo	153 1/2	17.5.36	33,756	+ 7,366	20	582,158	442,524	+ 139,634	Ord. Stk.	80	35	55 1/2	4 1/2
	Taltal	164	Apr., 1936	2,745	— 1,755	43	35 495	31,385	+ 4,110	Ord. Sh.	11 1/16	11/8	1	10
	United of Havana	1,353	23.5.36	30,689	+ 11,535	47	1,123,401	1,097,844	+ 25,557	Ord. Stk.	3 1/16	1	3	Nil
	Uruguay Northern	73	Apr., 1936	854	— 20	43	8,303	10,862	— 2,559	Deb. Stk.	4 1/2	2 15/16	4 1/2	Nil
Canada.	Canadian National	23,648	14.5.36	723,077	+ 61,694	19	12,480,842	11,739,895	+ 740,947	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78 5/8	52 1/2	67 1/2	5 15/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	103 5/8 §	93	101 1/2 §	3 15/16
	Canadian Pacific	17,237	21.5.36	518,490	+ 78,600	20	9,541,290	8,608,000	+ 933,200	Ord. Stk.	14 1/16	8 3/4	12 1/2	Nil
India.†	Assam Bengal	1,329	30.4.36	37,755	+ 2,331	4	101,842	99,425	+ 2,417	Ord. Stk.	92 1/8	77 1/2	85 1/2	3 1/2
	Barsi Light	202	30.4.36	3,735	— 420	4	11,655	12 465	— 810	Ord. Sh.	105	77 1/2	72 1/2	6 7/8
	Bengal & North Western	2,112	10.5.36	85,279	+ 532	6	332,354	316,982	+ 15,372	Ord. Stk.	30 11/2	291	310	5 1/8
	Bengal Dooars & Extension	161	30.4.36	3,164	+ 208	4	8,778	9,500	— 722	„	12 7/2	122	12 5 1/2	5 9/16
	Bengal-Nagpur	3,268	2.5.36	178,950	— 7,288	3	352,575	365,323	— 12,748	„	105	100 5/16	103 1/2	3 7/8
	Bombay, Baroda & Cl. India	3,072	20.5.36	255,525	+ 750	8	1,370,475	1,235,025	+ 135,450	„	115 1/4	110	113 1/2	5 5/16
	Madras & Southern Mahratta	3,230	30.4.36	177,000	+ 7,468	4	509,925	479,702	+ 30,223	„	128 1/2	113 7/8	112 1/2 §	8
	Rohilkund & Kumaon	572	10.5.36	17,647	+ 1,514	6	72,039	68,453	+ 3,586	„	29 4	26 2	30 0 1/2	5 5/16
	South India	2,531	30.4.36	112,685	— 2,261	4	341,613	346,474	— 4,861	„	119 3/4	104 1/4	106 1/2	7 1/16
Various.	Beira-Umtali	204	Mar., 1936	66,055	— 7,592	26	382,261	378,782	+ 3,479	—	—	—	—	—
	Bilbao River & Cantabrian	15	Apr., 1936	1,385	+ 333	17	6,062	7,150	— 1,088	—	—	—	—	—
	Egyptian Delta	622	10.5.36	5,613	+ 567	6	22 326	21,149	+ 1,177	Prf. Sh.	2	15/8	1 3/4	5 11/16
	Great Southern of Spain	104	16.5.36	1,363	— 563	20	21,959	37,963	— 16,004	Inc. Deb.	3 1/2	2	3 1/2	Nil
	Kenya & Uganda	1,625	Apr., 1936	245,898	+ 21,313	17	937,690	928,532	+ 59,158	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48	36	44	7 15/16
	Mashonaland	913	Mar., 1936	99,158	— 19,369	26	678 956	687.786	— 78,830	1 Mg. Db.	104 1/4	100	102 2	4 7/8
	Midland of W. Australia	277	Mar., 1936	12,915	+ 910	39	124,864	122 226	+ 2,638	Inc. Deb.	98 3/4	93	95	5 1/4
	Nigerian	1,905	11.4.36	37,003	+ 5,453	2	61,700	63 071	— 1,371	—	—	—	—	—
	Rhodesia	1,538	Mar., 1936	181,740	— 24,323	26	1,117,186	1,138,252	— 21,066	4 p.c. Db.	105 1/2	101	105	3 15/16
	South African	13,250	2.5.36	595,812	+ 7,682	5	2,718,015	2,513,418	+ 204,597	—	—	—	—	—
	Victoria	4,728	Dec., 1935	866,997	— 3 320	26	4,826 292	4,751.974	+ 74,318	—	—	—	—	—
	Zafra & Huelva	112	Mar., 1936	9,520	— 1,537	13	30,751	32,962	— 2,211	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/32.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.

Electric Railway Traction

Tyneside Third Rail Alteration

ONE of the most extensive and notable alterations in connection with electric railways has just been accomplished on the Tyneside lines of the London and North Eastern Railway, where, as part of the modernisation of the Newcastle suburban electric services, 80 miles of conductor rail have been altered to conform to the Ministry of Transport standard requirements. The Tyneside electrification was one of the earliest in the country, having been brought into use between March and July, 1904. Since then the Ministry of Transport regulations have been drawn up, and their observance now requires that the conductor rails should be 3¼ in. nearer to the running rail than in the original layout, thus conforming to the standard third-rail electrifications in other parts of the country. The task of carrying out this work, comparable in some respects with that involved by a gauge conversion, required very careful preparation and organisation, for not only had the 80 track miles of rail weighing from 82 to 120 lb. per yd. to be moved, but the 50,000 insulators on which these rails rested had also to be altered in position. Further, the track cables required extensive modification as well. The work was carried out over last week-end, when 500 men were specially detailed to the task. For three days, namely, Saturday, Sunday, and Monday, the normal electric services were suspended and replaced by special steam trains, and the minimum of inconvenience was suffered by passengers. At the same time as the conductor rail was being dealt with, the collecting shoes on the electric rolling stock were also being altered in position in the Gosforth sheds. The whole work was successfully accomplished and the normal electric train services began running again on Tuesday.

Economical Electrification

SOME of the most singular and effective aids to economical railway electrification are to be found on the 3,000-volt d.c. system of the South African Railways, which has grown very rapidly during the last three years. As we noted in the description of the South African system in the issue of this Supplement for August 23, 1935, the masts for the overhead construction are now made of discarded flat-bottomed rails electrically welded to cleats and cross braces, two rails being used for each mast. On the 61-mile Daimana-Harrismith line, for instance, over 3,000 masts were fabricated of old 60 lb. and 80 lb. rails. Again, in erecting the 88-kV. transmission line through difficult country in Natal, a good deal of expense was saved by the adoption of rockets for carrying lines across precipitous gorges, where on occasion the range of the hand-fired rocket apparatus was in excess of 1,500 ft. Another aid to economy has been found in the use of old 5½-in. superheater tubes and 2½-in. flue tubes for the framework carrying the outdoor h.t. switchgear at the substations, the frame being welded up. Elsewhere in this issue we reproduce two views of the Van Reenen substation on the Daimana-Harrismith section, which show the 88 kV. incoming feeders and isolators carried on boiler tube frames supported by concrete foundations. This substation is interesting as being one of those in which are installed grid-controlled rectifiers arranged for use in conjunction with regeneration. How greatly the cost of electrification may be reduced by the combination of such methods as those outlined above is seen by the expenditure of only £180,000 on the 70 track miles of the Daimana-Harrismith line, including the erection and equipment of two substations and a 60-mile transmission line. The latter was carried along the top of the contact wire masts on some sections.

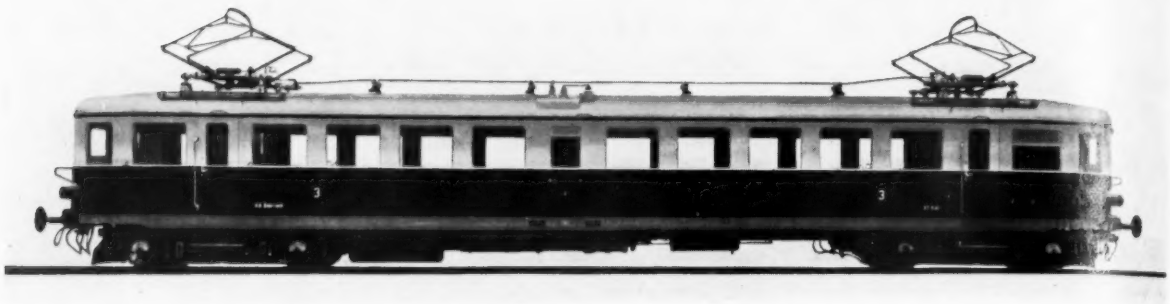
German Electric Services

THE 1,300 h.p. two-car articulated trains on the Bavarian single-phase system of the Reichsbahn are now being given work a little more commensurate with their output of 13½ h.p. per ton and their capacity for a top speed of 100 m.p.h. Over the 38·4 miles from Munich to Augsburg there are now two schedules of 69·5 m.p.h. and two over the 52·5 miles from Augsburg to Ulm at 68·5 m.p.h. In the reverse direction the timings are 63·0 m.p.h. between Ulm and Augsburg, and 64·0 and 65·8 m.p.h. from Augsburg to Munich. The whole run of 148·9 miles from Munich to Stuttgart is covered in 144 min. inclusive of two stops and the surmounting of the 1 in 40 Gieslingen bank and other heavy grades between Ulm and Stuttgart. There are 13 runs a day, aggregating 633 miles, covered at an average of over 60 m.p.h. for which electric locomotives or articulated trains are responsible. The Orient Express is hauled non-stop between Munich and Stuttgart in each direction, and these two runs, with an average speed of 52·6 m.p.h., are the longest electrically hauled non-stop journeys in Germany.

Electrification and Coal

THE discussion which followed Mr. E. R. Kaan's paper on railway electrification, read before the Institution of Electrical Engineers on April 30 and abstracted in our issue of May 1, provided an example of the inversion of true values that is so remarkable a feature of the present time. The true object of electrification is to provide more efficient transport than is possible with steam traction. That this was recognised by some of the speakers was obvious from the fact that they advocated diesel traction as an alternative step towards transport efficiency. But they were countered by others who preferred electrification because it would necessitate the consumption of British coal, whereas the extension of diesel haulage would call for an increase in the importation of oil. If the using up of our coal resources were an end to be desired, and the conservation of overseas oilfields one of our principal interests, it would make for clarity to say so frankly. Nothing useful is likely to come out of a discussion in which there is not a clearly defined and agreed objective. Perhaps that is why electrification in this country makes such slow progress.

NEW ELECTRIC STOCK IN AUSTRIA

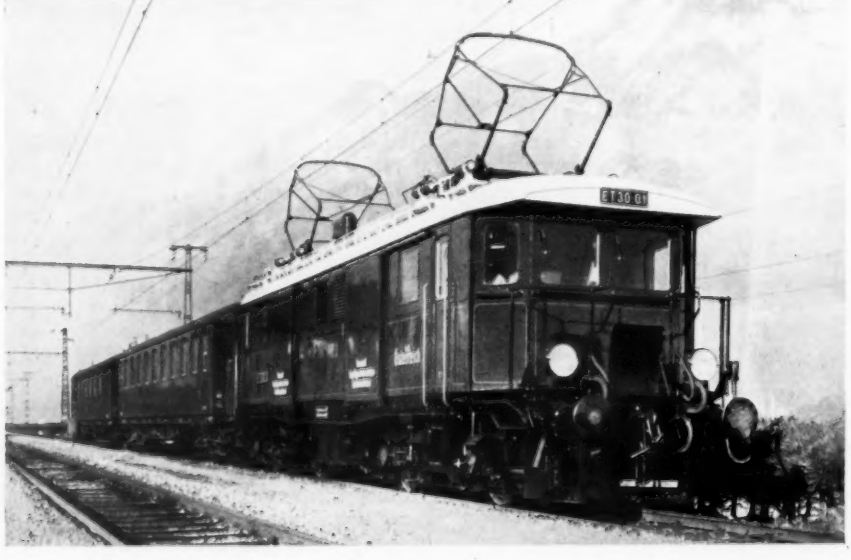


Single-phase 540 h.p. express motor-coach of the Federal Railways

DURING the past few months new motive power units of two types have been introduced on the 15 kV. electrified system of the Austrian Federal Railways. The first is a motor-coach intended for fast traffic, and compared with previous Austrian motor-coaches its weight of 48 tonnes is relatively light. Built by the A.E.G.-Union Elektrizitäts Gesellschaft and the Wiener Lokomotivfabrik, it is of all-steel welded construction with the electrical equipment, apart from the pantographs, main oil switch, and driver's controllers, arranged below the underframe. The transformer has a capacity of 360 kVA. and the line current is passed through it to two traction motors located on one bogie; these motors have a one-hour rating of 200 kW. each. The motors are self-ventilating but the fans on their armature shafts draw in the air through ducts in the entrance vestibule to the passenger compartment. The car is heated electrically by means of a 15 kW. heater fed with 1,000-volt current from the transformer.

Within a length over headstocks of 73 ft. 6 in. are 80 third class seats and 36 sq. ft. of luggage room. The bogies have a wheelbase of 10 ft. 6 in. and are pitched at 52 ft. 3 in. centres. A braking force of 38 tonnes is exerted by the Hardy air brake and the effort is applied through two shoes on each wheel. Normally the speed of the car does not exceed the Austrian maximum of 100 km.p.h. (62 m.p.h.) but during tests undertaken in March a speed of 130 km.p.h. (80 m.p.h.) was reached, and an acceleration of 1 m.p.h. p.s. from zero up to 62 m.p.h. was attained.

The second type of new vehicle is a cross between a double-bogie locomotive and a freight motor-coach, for practically all of the interior is given over to the carriage of parcels and light goods, and in service the vehicle hauls two or three passenger carriages or a light goods train. Each of the four nose-suspended motors has a continuous rating of 165 kW. and a one-hour rating of 200 kW., giving total outputs of 885 and 1,070 h.p. respectively. The tractive effort on the one-hour rating is 12,100 lb. at 33 m.p.h. and the starting tractive effort is 17,600 lb. There are two transformers with a combined continuous rating of 720 kVA. The 37·4 in. wheels are arranged in bogies with a wheelbase of 10 ft. 2 in. and pitched at 25 ft. 3 in. centres. The vehicle is 51 ft. long over buffers and tares 60 tonnes; the freight capacity is 3·5 tonnes and the maximum speed 56 m.p.h. Electric welding has been used very extensively, and each bogie frame structure and the underframe are welded up as complete units.



One of a batch of 10 mixed traffic electric motor-coaches, classified ET.30, of the Austrian Federal Railways. They have an output of 1,070 h.p. and the interior is used for the conveyance of light goods or parcels. With three bogie passenger cars one of these units accelerated from zero to 56 m.p.h. in 120 sec. up the 1 in 37 grade of the Tauern line

ELECTRICAL EQUIPMENTS ON SINGLE-PHASE LOCOMOTIVES

*By DUNCAN B. McKENZIE, B.Sc.**

SINCE the major factor governing the properties of an electric locomotive is its capacity to run in either direction at a variable speed, a limit on the choice of motors is imposed. The single-phase commutator motor appears to be the most satisfactory, and it may be said that in all modern single-phase systems in which the motors are supplied with single-phase current the series type of commutator motor is universally employed. On account of the properties of this motor a low frequency is necessary, and it is due to this factor that difficulties arise in tying in a single-phase traction system with industrial networks.

Owing to the presence of a commutator, the motors must be supplied at a low voltage, except in certain repulsion motors, the stators of which may be wound for trolley voltage, but for traction work it has been found preferable to wind these stators also for a lower voltage. It may therefore be stated that a transformer is required in all locomotives employing single-phase commutator motors.

Transformers

A transformer must be carried for the above-mentioned reason, and this piece of apparatus makes a very suitable means of obtaining a variable voltage for speed control by tapping the windings. In addition, each voltage tapping gives an economical running speed, and the necessity of grouping the motors in different combinations is obviated. In general all the motors are connected in parallel, exception to this being desirable only when the armatures are mechanically coupled.

In the older locomotives the main switch was placed in a separate high-voltage compartment, but in modern layouts this switch is built into a steel tank which passes through a hole in the roof and is supported by a flange bolted to the roof. The oil switch, used by most railway organisations, employs the multi-break principle. These switches are designed to clear minor overloads on the locomotive, but when a major overload occurs, such as a short-circuit in the high-voltage circuit, the substation breakers are relied upon to clear the fault. The 2-Co-2 Class P5A locomotives of the Pennsylvania Railroad in America have no oil circuit-breaker on the locomotive, and the designers relied wholly on the locomotive contactor gear and substation breakers to clear all faults.

The earlier designs of power transformers for traction purposes were of the air-insulated type, and this type has survived in America and is extensively used on their 11-kV. lines. In Europe, however, owing to the higher trolley voltage of 15 kV., considerable trouble was experienced due to creeping sparks and allied phenomena, and recourse has been had to the oil-insulated transformer. For capacities up to about 500 kVA. the natural circulation of the oil inside the tank suffices, but above this value forced circulation with external cooling tubes is desirable. The cooling tubes can take various forms. A type which has proved successful in Switzerland has the tubes mounted on the outside wall of the locomotive; this allows the outside air to cool the oil. This layout has limitations, since the cooling efficiency drops considerably at the lower speeds and in stations. On other locomotives special coolers are used which place the oil-cooling pipes in a tank through which cool air is blown by a fan. The air-insulated transformer as used at present in America is cooled by a current of air which is continuously blown over the windings.

Low-voltage Control

The control of the motor speed is accomplished by a switch-group in conjunction with the transformer. Connections may be taken from the tappings of the power transformer, or the motor voltage may be regulated by an induction regulator, or by a combination of both. When the transformer winding is tapped there is only a limited number of voltages, and if only one contactor is closed at a time it is necessary to open the circuit at each transition point, with subsequent jolting of the locomotive and train, besides the production of excessive surges in all electrical circuits. Also, severe arcing takes place at each contactor.

As is evident, the closing of two contactors would give a continuous supply to the motors, but in addition would short-circuit a section of the winding. A practical solution of this problem is to be found in the inclusion of a "preventive coil," which is connected between successive contactors; the motors are fed from the centre point of this coil.

The preceding grouping, though simple, has disadvantages for large locomotives, since each contactor requires to carry a very heavy current, and also many tappings are necessary for smooth acceleration. The contactors may be connected in parallel, but this in turn involves additional expense. A system has been devised in which, for example, 12 tappings are taken from the transformer through 12 contactors to three choke coils, giving nine economical speeds. This grouping, despite the fact of requiring many tappings and contactors, has the merit of dividing the motor current equally between four contactors.

High-voltage Control

With increase in the size of the modern electric locomotive a limit has been reached in the size of the low-tension leads required to feed, say, a four-motor locomotive. This is especially evident in the machines required for heavy mountain services, and a new high-voltage control system is being operated successfully on two of the large locomotives ($1B_0\,1\,B_o1 + 1B_0\,1\,B_o1$, Nos. 11801 and 11851) of the Swiss Federal Railways for the the heavy passenger and freight traffic over the St. Gothard. A modification of the low-tension tapping switch has been used, but the whole switch has been placed in the same tank as the transformer.

* Abstract of paper read before the Mersey and North Wales (Liverpool) Students' Section of the Institution of Electrical Engineers.

G.E.C. WORKS AT BIRMINGHAM.—During the Institute of Transport Congress at Birmingham a number of members visited the Witton works of the General Electric Co. Ltd. where that company's traction equipment is manufactured. At the moment 200 sets of electrical equipment for trolley buses for the London Passenger Transport Board are being made at Witton.

MOSCOW UNDERGROUND.—The Soviet authorities have approved the technical plan for the construction of the second line of the Moscow Metro. This line will have nine stations within a length of 7¾ miles. The estimated cost is 910 million roubles.

A TWO-VOLTAGE CROSSING IN AMERICA

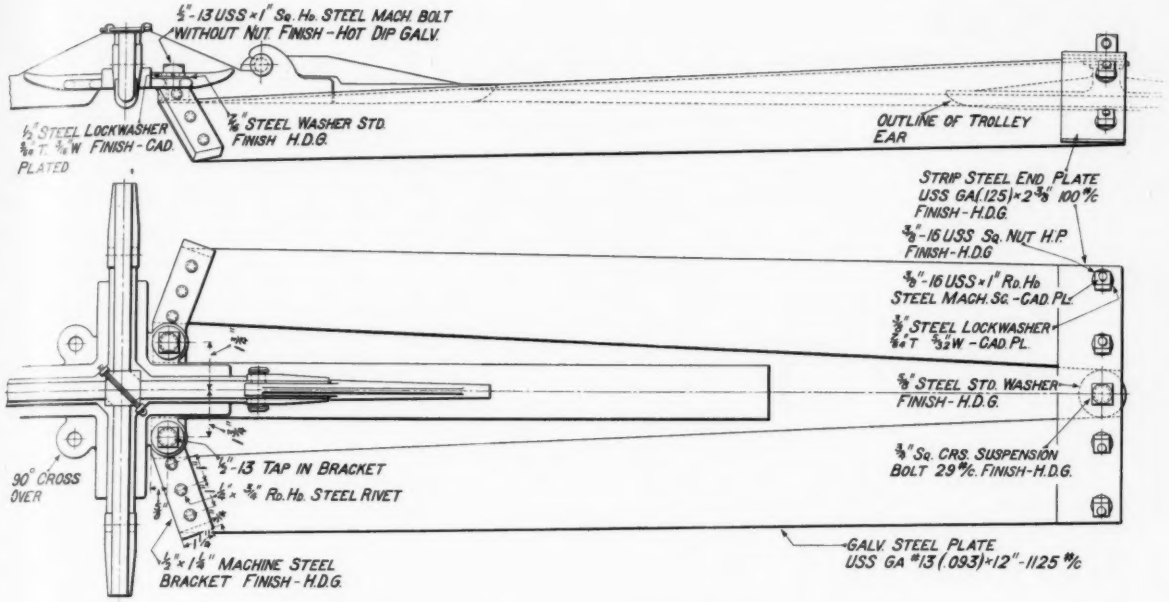
AN interesting crossing on electrified lines exists in the U.S.A. where the one 1,200-volt d.c. and two steam lines of the Baltimore & Annapolis Railroad cross on the level at 90 deg. the two 600-volt d.c. tracks of the Baltimore Transit Company. The latter company objected to the use of an isolated overhead section which could be energised with 1,200-volt current, even though it was separated by interlock switches from the d.c. trolley. The construction work and new equipment at the crossing was carried out by the Baltimore & Ohio Railroad under the direction of Mr. J. H. Davis, chief engineer for electric traction.

To meet the requirements of the Baltimore Transit Company, the 600-volt overhead crossing is insulated entirely from the 1,200-volt contact wire, and the Baltimore & Annapolis motor-coaches coast over the crossing. These motor-coaches have sliding shoe current collectors, but the vehicles of the transit company are fitted with trolley wheels. To prevent the loss of 600-volt power on trains passing over the crossing, the usual type of mesh trolley guard is placed over the 600-volt contact wire. A trolley wheel which happens to run off the wire will make contact with the mesh which is also energised, and the motor-coach thus receives power even though the wheel is off the wire. If this guard were not fitted a trolley off the line would strike the 1,200-volt contact line.

On each side of the low-tension contact wire is a trolley guard of plate, arranged below the mesh. This side guard is an inverted U in section. It fits the mesh guard at its outer ends but is dropped as it approaches the high-tension wire so that the upper curve of the inverted U is flush with that wire at the actual crossing. This device was necessary to prevent a trolley wheel from the 600-volt line striking the 1,200-volt wire. A transverse slot is cut in this guard to prevent the collecting shoes on the 1,200-volt system striking it on the crossing.

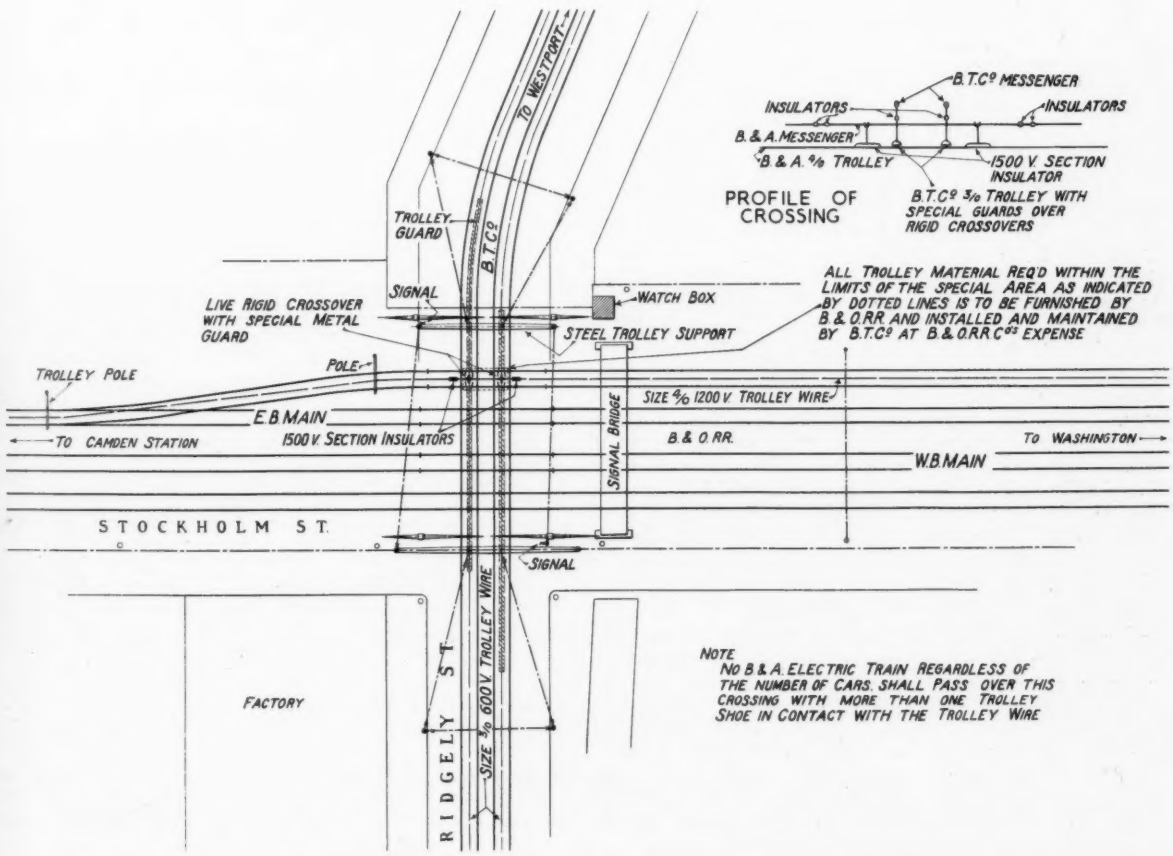
The general arrangement and details of the two-voltage crossing are shown in the drawings reproduced on the opposite page by the courtesy of Mr. Davis. As regards the normal overhead construction on the Baltimore & Annapolis, wood masts are in general use and are spaced at 120 ft. intervals on straight track. The contact wire is 4/0 B. & S. grooved copper.

90 deg. crossing of the 1,200-volt d.c. line of the Baltimore & Annapolis Railroad with the two 600-volt d.c. lines of the Baltimore Transit Company


½"-13 USS×1" Sq. Hd. STEEL MACH. BOLT WITHOUT NUT FINISH-HOT DIP GALV.
½" STEEL LOCKWASHER ⅝ T. ⅜ W FINISH-CAD. PLATED
⅞" STEEL WASHER STD. FINISH H.D.G.
OUTLINE OF TROLLEY EAR
STRIP STEEL END PLATE USS GA(.125)×2⅜" 100% FINISH-H.D.G.
⅜"-16 USS Sq. NUT H.P. FINISH-H.D.G.
⅜"-16 USS×1" Rd. Hd. STEEL MACH. Sq.-CAD. PL.
⅜" STEEL LOCKWASHER ⅝ T ⅜ W-CAD. PL.
⅜" STEEL STD. WASHER FINISH-H.D.G.
⅜" Sq. CRS. SUSPENSION BOLT 29% FINISH-H.D.G.
90° CROSS OVER
½"-13 TAP IN BRACKET
⅛"×⅜" Rd. Hd. STEEL RIVET
½"×1¼" MACHINE STEEL BRACKET FINISH-H.D.G.
GALV. STEEL PLATE USS GA #13(.093)×12"-1125 #%

Above: ***Drawing of the trolley guards fitted to the 600-volt d.c. contact wires***

Below: ***Plan of the crossing at Ridgley Street, Baltimore, where two 600-volt d.c. wires cross one 1,200-volt d.c. wire on the level at 90 deg.***


TO WESTCOTT
B.T.C° MESSENGER
INSULATORS
INSULATORS
B. & A. MESSENGER
B. & A. ⅘ TROLLEY
1500 V. SECTION INSULATOR
PROFILE OF CROSSING
B.T.C° ⅗ TROLLEY WITH SPECIAL GUARDS OVER RIGID CROSSOVERS
TROLLEY GUARD
B.T.C°
SIGNAL
WATCH BOX
ALL TROLLEY MATERIAL REQ'D WITHIN THE LIMITS OF THE SPECIAL AREA AS INDICATED BY DOTTED LINES IS TO BE FURNISHED BY B. & O.R.R. AND INSTALLED AND MAINTAINED BY B.T.C° AT B. & O.R.R C°'S EXPENSE
LIVE RIGID CROSSOVER WITH SPECIAL METAL GUARD
STEEL TROLLEY SUPPORT
TROLLEY POLE
POLE
SIZE ⅘ 1200 V. TROLLEY WIRE
E.B. MAIN
TO CAMDEN STATION
1500 V. SECTION INSULATORS
SIGNAL BRIDGE
B. & O. R.R.
TO WASHINGTON
W.B. MAIN
STOCKHOLM ST.
SIGNAL
FACTORY
RIDGELY ST.
SIZE ⅗ 600 V. TROLLEY WIRE
NOTE
NO B. & A. ELECTRIC TRAIN REGARDLESS OF THE NUMBER OF CARS, SHALL PASS OVER THIS CROSSING WITH MORE THAN ONE TROLLEY SHOE IN CONTACT WITH THE TROLLEY WIRE

DRAWINGS OF THE 600–1,200 VOLT D.C. CROSSING ON THE BALTIMORE & ANNAPOLIS RAILROAD

THE ELECTRIFICATION OF THE MURMANSK RAILWAY

By A. V. ILINSKY

FROM the beginning of the great war, the question of victualling the Russian armies by the Allies was raised. The problem was solved to some extent by the construction of the Murmansk railway (now known as the Kirov railway) between Zvanka, on the Northern railway and Murmansk, a port situated on the Arctic Ocean and open all the year to navigation. The total length of the line, including the branch line from Apatite to Kirov is about 1,349 km. (840 miles).

The difficult geographic and climatic conditions necessitated a close study on the part of the constructors, but the military exigencies would not allow any delay and the line was exploited, before its completion, in 1916, although the depth of the ballasting was inferior to the normal by 25 per cent. The number of sleepers per km. of track does not exceed 1,417, and most of the constructional work is in wood. The rails are only 32 kg. per metre (65 lb. a yd.).

The statistics of the last ten years show that the number of goods trains has multiplied by 14½, and that the daily wagon-loading has been multiplied by eight, to the limit of the line's capacity. The absence of coalfields makes it necessary to obtain coal from the Donbass, 2,500 km. (1,550 miles) away from Zvanka, and the cost is almost 30 roubles a ton, calculated on the following basis:—

	Roubles per ton
Cost of extraction	11·63
Transport	16·40
Supplementary expenses	1·50
Total	29·53

The presence of great hydraulic resources in the region, estimated at 900,000 kW., makes possible an economy in the annual coal bill of 4·85 million roubles, assuming that the whole line is electrified and the consumption 376,000,000 kWh. at 2·5 kopecs per unit.

Moreover, the hydraulic power is distributed along the line and obviates the construction of a high-tension transmission line. The Soviet authorities estimate that the economies of electrification as a whole will enable the cost of the conversion, not including the hydro-electric stations or the rolling stock, to be covered within seven years.

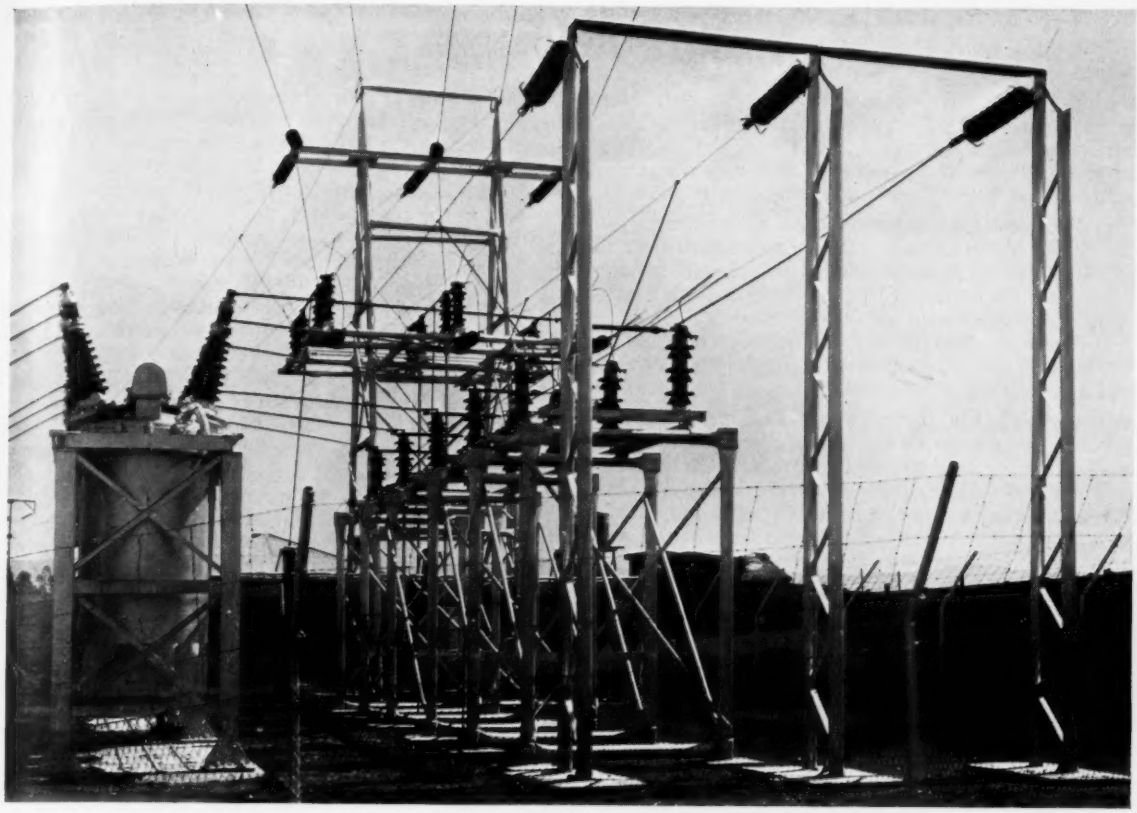
The northern part of the line has numerous curves of small radius and a ruling gradient of 1·45 per cent. (1 in 69). As the density of the traffic is not, and will not be, the same all over the line, electrification of the sections carrying the heaviest traffic is being done first, and since the end of 1935 the 91 route km. between Kandalaksha and Apatite, and the 22 km. branch line from Apatite to Kirov have been operated electrically by Russian-built locomotives. Electrification of the 185 route km. from Apatite to Murmansk is almost complete. On the southern division the section from Zvanka to Maselskaia has the densest traffic and is scheduled for electrification first. It will be followed by the conversion of the Kandalaksha-Loukhi and Kem-Maselskaia sections. When the whole line is electrified it will be fed through ten mercury rectifier substations with a total installed capacity of 46,000 kW. Actually, the Zvanka-Petrosavodsk section has the heaviest traffic of the whole line, but during recent years the permanent way, layout, and signalling has been much improved, and enables the FD 2-10-2 steam engines to be employed, and the necessity for electrification is not so pressing as it is for the northern section.

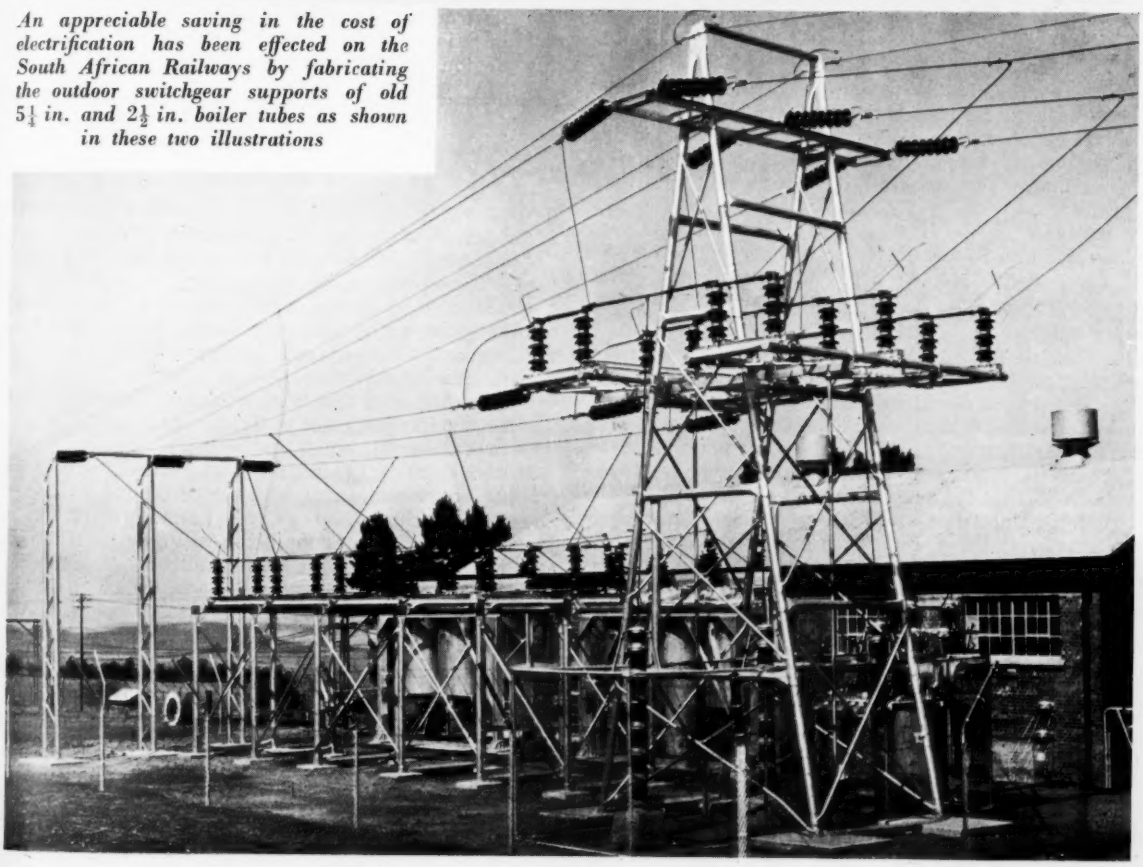
Map of Murmansk railway and adjacent lines

On the Kandalaksha-Murmansk section and the Kirov branch it was estimated that 15,830,000 roubles would cover the contact line, substations, locomotive sheds, and the housing for the personnel, but actually the cost came to 21,851,000 roubles, of which 11,722,000 roubles were due to the substations, and 5,624,000 to the overhead construction. On this section 34 electric locomotives have replaced 95 steam units.

Publication Received

The Electrician Annual Tables of Electricity Undertakings, 1936. London: Benn Brothers Ltd., Bouverie House, Fleet Street, E.C.4. 12 in. × 9¾ in. × ½ in. 242 pp. Price 10s. net, postage 9d.—It would be idle to dilate on the usefulness of this publication to those engaged in, or in touch in any way with, the electrical supply industry in this country, but in addition to a complete list of the supply undertakings and power companies in Great Britain and Ireland there are comprehensive lists of the supply authorities in the Dominions and Colonies and in foreign countries. In practically every case particulars are given of the generating plant, the supply system, and the tariff. There is also a map of the British grid system and a list of the selected power stations.





An appreciable saving in the cost of electrification has been effected on the South African Railways by fabricating the outdoor switchgear supports of old 5¼ in. and 2½ in. boiler tubes as shown in these two illustrations

NOTES AND NEWS

Swedish Locomotive Record.—The Swedish State Railways recently carried out a test run over their electrified system by running a 560-tonne train through from Malmo to Aange, a distance of 626 miles. The locomotive, one of the standard 1-C-1 type, was not changed *en route*.

New Electric Stock for Moscow.—Some streamlined electric trains of light-weight alloy steel construction are being built at the Mitischi car works for service on the long-distance suburban routes to the north and north east of Moscow. They will operate on the 1,500-volt d.c. system and will have a maximum safe speed in excess of 80 m.p.h. Track renewals are being made in readiness for the introduction of much faster schedules.

Rolling Stock for New York.—Last year the New York Board of Transportation, which operates 31·5 route miles of subway, ordered 250 electric cars from the American Car & Foundry Company, 150 from the Pullman-Standard Car Manufacturing Company, and 100 from the Pressed Steel Car Company. At the same time 20 spare trucks were ordered, and the cost of the whole equipment was $19,200,000. Delivery of the cars began in January and it is expected that the whole 500 will be in service by the end of the summer.

Rack Railway Conversion.—Preliminary work has begun on the electrification of the Pilatus Railway. It is anticipated that the overhead equipment will be erected by late autumn, and the new rolling-stock is to be delivered next spring. Electric traction is therefore expected to be inaugurated with the opening of the 1937 seasonal traffic. Electrification of the Vitznau-Rigi Railway is also contemplated. This line, opened in 1871, was the first rack mountain railway in the world. The Arth-Rigi Railway was opened in 1875 and electrified in 1907.

Further Swiss Electrification.—A credit of fr. 867,000 has been authorised by the Swiss Federal Railways Administrative Board for the electrification of the single-line Sonceboz-Moutier section. Both terminal stations are on electrified lines, there are no large intermediate stations, and gradients are severe; electrification is therefore entirely justified, especially as it will not be necessary to purchase additional locomotives or railcars for use on this line. The inauguration of electric traction is to coincide with the introduction of the summer timetable in May, 1937.

New Danish Rolling Stock.—In connection with the lengthening of the standard sets from three to four coaches on the Copenhagen electrified services, 23 new trailers are on order, as well as 8 aluminium-alloy driving trailers. The 23 ordinary trailers will be of all-steel construction like the previous electric stock, but hollow sections will be employed with the result that the new trailers will weigh only two tons more than the aluminium-alloy driving trailers. On account of the lengthy lock-out and strike during the spring this new stock will not be ready in time for Whitsun, which is unfortunate, as Whit Monday always produces the highest suburban traffic peak of the whole year.

Wirral Electrification.—The preliminary design for a three-car articulated train with a novel form of two-pivot bogie has been given up by the L.M.S.R., and an order for 19 three-car non-articulated sets has been placed with the Metropolitan-Cammell Carriage & Wagon Co. Ltd. and the Birmingham Railway Carriage & Wagon Co. Ltd. This stock will be able to work over the Mersey Railway and will be of all-steel fireproof construction. Each set will comprise a third class motor-coach with two motor bogies, a composite trailer, and a third class driving trailer, and they will be arranged for the operations of two or more rakes in multiple-unit when traffic requires. The seating capacity of each set will be 141 third and 40 first, and the cars will be of the saloon type with wide gangways and large vestibules. Light, high tensile steels and aluminium alloys will be used in the construction and the bodies and roof panels will be of steel. The underframes and bogies will be built on the latest principles, and roller bearing axleboxes will be fitted. There will be two doorways 3 ft. 9 in. wide on each side of each car, and air-operated sliding doors controlled by the guard will be fitted to ensure rapid loading and unloading of the trains. Ventilation will be by sliding or hinged lights above the side windows, and the electric heaters will be thermostatically controlled. Most of the electrical gear will be carried on the motor-coach underframe, thus allowing the maximum space for passenger seating. This equipment will be built by the British Thomson-Houston Co. Ltd. In order to save weight the contour of the coaches has been reduced and will be somewhat after the style of the cars used on the London Underground.

Durban Bay Railway.—The new electrified Bay railway at Durban was opened to traffic on May 3. A mixed goods and passenger train, drawn by an electric locomotive built in the administration's workshops, inaugurated the regular service to the Point. Simultaneously with the opening of this line, the old one which passes between the West Street booms, went out of use. This was the oldest line in the country, having been opened in 1860. The Congella marshalling yard has been brought into full electric operation. The yard extends for 2½ miles from Berea Road to Umbilo and contains about 20 miles of electrified track. The construction of the Bay railway has also entailed the reorganisation of the Cato Creek marshalling yard, which was previously only a shunting yard.

An Insulating Material for Traction Purposes

INSULATING material used in transport work operates under arduous conditions, and early failures are not uncommon when the material is exposed to mud and rain. The problem of eliminating these failures and obtaining an insulation which will last indefinitely is constantly before maintenance staffs, and for that reason we believe that they will be interested in a type of rubber splicing compound which has just been brought to our notice and which is used on numerous electric vehicles, more particularly for the lapping of two-way connectors.

Marketed under the trade name of Slipknot rubber splicing compound, it is made by Rotunda Limited, of Denton, Manchester. It is sold normally in 8 oz. rolls ¾-in. wide, but can be supplied in wider widths if required, and is in the form of a black rubber tape interleaved with a protective layer of red cloth, which is removed when a length of tape is required for lapping. When lapped on to a joint with a slight tension the tape moulds itself into a solid piece which will withstand high dielectric stresses, and this without any heating or vulcanisation. Experience over long periods with applications to transport work, electric cranes, trucks, and in street lighting and shipyards have shown the Slipknot compound to be virtually unaffected by weather conditions. Combined with a tensile strength of about 250 lb. per sq. in. recent tests have shown that a lapping of 0·245 in. radial thickness could withstand a voltage of 35,000.